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Intel's new CPU lays the
smack down on AMD's best!

First Report: HD-DVD & Blu-ray
Discover the hidden truth about the
next-gen optical disc formats!

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Ed Word



The More Things Change...

Please send feedback and shortbread to will@maximumpc.com.

By now, you all know that AMD has purchased ATI for a whopping \$5 billion and change. The rumor had been floating around the Internet for several months prior to the official notice, but it's the biggest technology deal so far this decade, and it will have a more profound impact on us—the PC geeks—than the HP/Compaq merger or the Apple/Intel marriage.

It's a huge deal, but I don't expect to see a massive shakeup in the short term. AMD will continue selling CPUs, but will add videocards and motherboard chipsets as well. It's likely that the Radeons at Best Buy will sport AMD logos come the end of this year. And AMD is committed to supporting ATI's customers.

The long-term ramifications are much more interesting, but worrisome. AMD's official reason for buying ATI is to kick-start its chipset division—long a weakness of AMD. It plans to continue offering discrete graphics, but 3D wasn't a primary concern.

My worst fear is that AMD will cede the high-end 3D hardware market to nVidia, eschewing expensive-to-develop premium 3D hardware for cheap-'n'-easy low-end parts. After all, R&D for a high-end GPU like the Radeon X1900XTX is mind-numbingly expensive. It could be tempting for the bean counters in Sunnyvale to cut loose the high-end 3D R&D the first time the wind shifts in an unfavorable way. The battle between ATI and nVidia is one of the reasons graphics have

progressed so far in the last five years.

Could my nightmare scenario happen? Maybe, but it's pretty unlikely. If AMD cedes the high-end 3D market, it would also be leaving the lucrative high-end gaming market—on the CPU, chipset, and graphics fronts. It would be foolish to throw away the last two years of good will captured by the Athlon 64 processor, not to mention the dump trucks full of money that gamers spend every year on hardware.

Of course, I've heard a ton of conspiracy theories about the buyout as well—ranging from realistic (AMD purchased ATI to break into the cellphone market) to the insane (ATI only approved the sale because it feared the Xbox curse that afflicts every vendor who builds hardware for Microsoft consoles).

Maximum PC's own Gordon Mah Ung posited a slightly more plausible theory this afternoon: What if AMD uses its new graphics prowess to fork PC architecture? Could AMD build a custom motherboard and graphics solution—a la Xbox 360—that leverages a custom chipset with high-speed interconnects between the CPU, a proprietary GPU, and the system memory to outperform Intel and nVidia, while retaining Windows-compatibility? Only time will tell.

Will Smith

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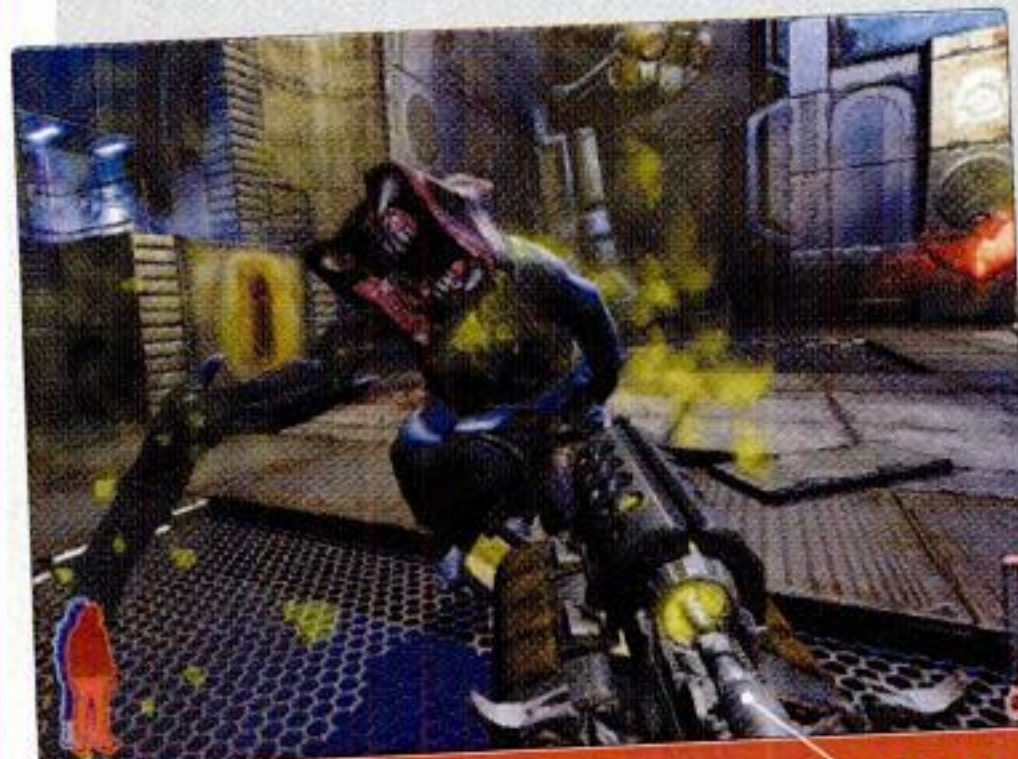
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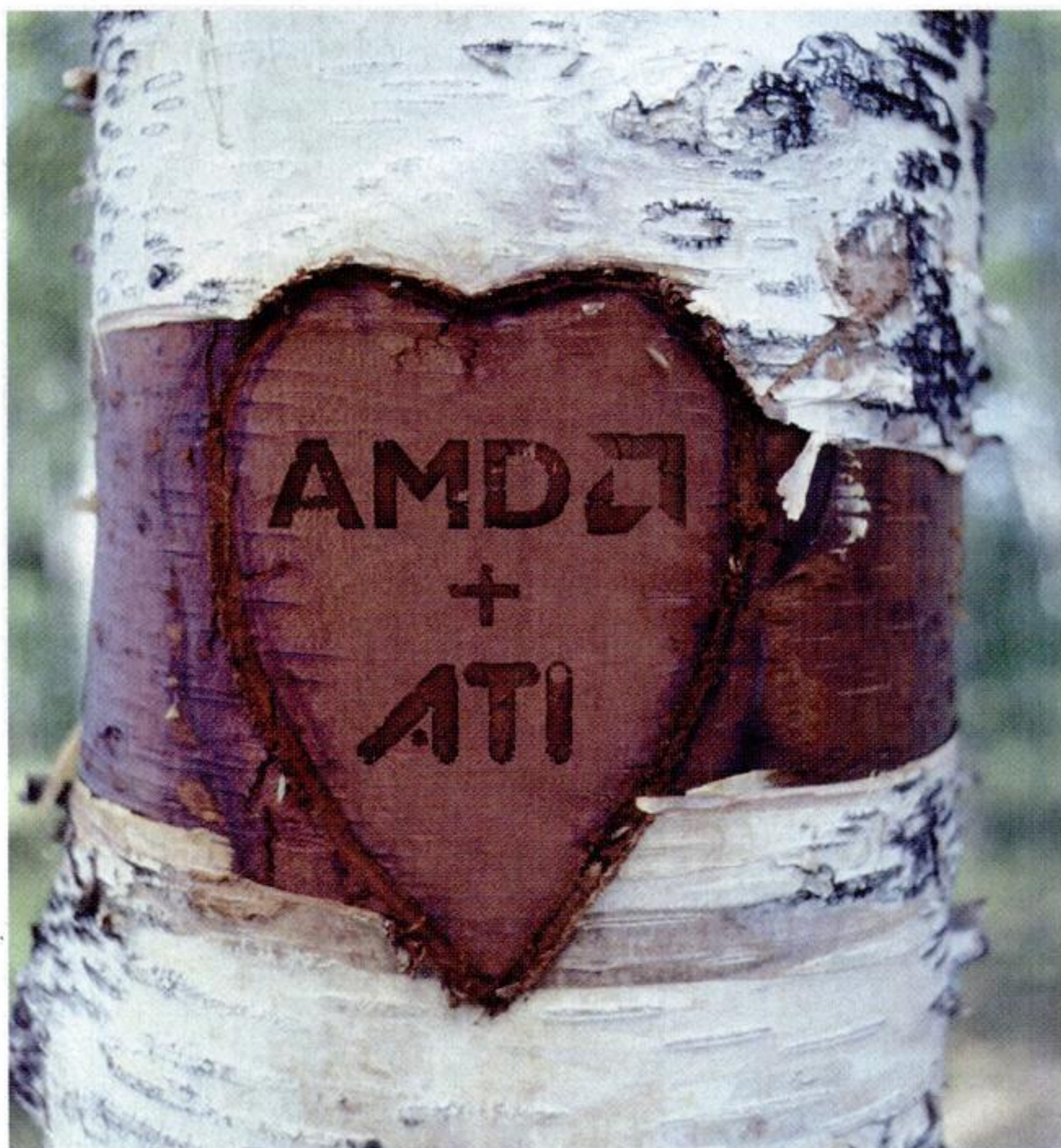
AMD rocks the PC landscape with its surprise purchase of graphics vendor ATI. Could this be the “synergy” that will allow both companies to topple their rivals?

One look at today’s tech headlines and you might think it was *Wife Swap* or *Desperate Housewives*, not the boring old PC industry. In the latest surprise coupling, AMD has shocked the world by announcing it will buy graphics vendor ATI for \$5.4 billion.

Coming on the heels of Apple divorcing IBM to hop into bed with Intel, and Dell and Alienware doing the horizontal mambo, it’s like the nerd version of the 1960s free love movement.

But AMD’s affair could be the most intriguing tryst of the season because the alliance will allow AMD to compete directly with Intel in one of its most profitable markets: mass-market desktop PCs. AMD officials said that in the short-term the company needs its own core-logic chipset to further penetrate the commercial and enterprise market, where stability and complete solutions trump all-out performance.

But, said AMD marketing architect Hal Speed, “What it ultimately came down to wasn’t just chipsets, but where AMD is headed and where graphics is headed.” The easiest thing to do to continue to grow AMD’s business was to buy ATI outright and get its chipset unit. With graphics headed for some form of integration with the CPU, ATI’s expertise in graphics further sweetens the pot. And that doesn’t even get into ATI’s presence in



It took us by surprise, but apparently AMD has had the hots for ATI. It won't be long before we hear the pitter-patter of AMD Radeon videocards.

HDTV and mobile phones — two areas, Speed points out, where Intel has failed.

Speed said he doesn't ever see discrete graphics going away completely, but for developing nations where a \$500 graphics card or even a \$100 GPU is out of the question, a CPU with built-in graphics and memory might make perfect sense. However, there are no guarantees.

Intel tried a similar tack in the late 1990s with its stillborn Timna CPU. Speed, who worked on Cyrix's similar MediaGX chip, said Timna is no way to judge the concept. While Timna and others reused old technology, Speed wondered aloud what would happen if someone tried it with leading-edge CPU, GPU, and core-logic chipset technology?

Of course, AMD must walk the tightrope with its new acquisition and avoid offending either company's partners: nVidia and Intel. (nVidia has helped float AMD's boat with SLI-compatible chipsets, while ATI's Intel-compatible chipsets are a source of about \$100 million in revenue. Speed said AMD's friendly track record with its partners should help it maintain its relationships with nVidia and Intel, as well as with VIA, SIS,

and ULI. Officials at nVidia agreed and said the company will continue to work with AMD on its products. Despite the statements, it's clear the AMD/ATI deal already has pushed nVidia and Intel closer together. At the launch event for the new Core 2 CPUs, it was an official from nVidia—not ATI—who spoke.

“The bottom line is, ATI threw in the towel,” said nVidia's Derek Perez. “[the merger] gives us a unique opportunity to be the independent provider of GPUs for everyone.”

Intel officials were mostly mum on the deal, saying the company was still trying to work out the ramifications. “It's too early to say,” said Chuck Malloy when asked how Intel would respond.

Malloy said reports that Intel had revoked ATI's Pentium/Core 2 bus license were incorrect, and the status of it had not changed. Speed, however, contradicted Intel's official response by saying that ATI's Pentium/Core 2 bus license had already expired. Speed said that it was a moot point anyway, as a cross-licensing deal between AMD and Intel would let ATI make the chipsets without having to pay any royalties.

Beefy PSUs and Videocards on the Way

1-kilowatt power supplies to be required for SLI?

If you witnessed the arrival of 1-kilowatt PSUs and rolled your eyes, we have some bad news for you—you're gonna need one when the next-gen videocards from nVidia and ATI arrive. PSU birdies have informed us that next-gen cards from both graphics manufacturers' will suck down as much as 300 watts—per card. Today's top-of-the-line cards guzzle around 115 watts under load.

Though no specs have been revealed for these top-secret GPUs as of yet, it's clear they will be insanely powerful. There

are even rumors circulating that one of these next-gen videocards may come water-cooled from the factory!



Preview

50 Terabytes...on a Single Disc?

Protein-based optical storage could spell the end of hard drives, or at least that's what one U.S. researcher thinks

We all know that protein is good for us, even vegetarians. But a researcher at Harvard has found out that protein is good for data storage as well. By coating a disc with a thin layer of proteins, he claims he'll be able to create a recordable disc with a 500 gigabyte storage capacity. Eventually, he says, the protein coating will be able to hold up to 50 terabytes, completely eliminating the need for magnetic storage in industries such as defense, medicine, and of course, movie-making.

Current optical storage has pits stamped (or burned) on the disc's surface. The resulting raised and lowered areas on the surface correspond with binary ones and zeroes. The new technique uses a light-

activated protein that can capture and store sunlight in unique shapes and colors, in areas much smaller than today's disc pits. These shapes can represent the ones and zeroes needed for data storage.



FAST FORWARD



TOM
HALFHILL

Nut Neutrality

When a columnist takes a stand that enrages many of its readers, there's only one thing for a responsible journalist to do—poke harder!

I warned my editor that my previous column ("The Myth of Net Neutrality," July 2006) against network neutrality might be controversial. What an understatement. I didn't realize how many people actually believe that tiered Internet service will drive small businesses into bankruptcy, turn email into snail mail, and endanger global democracy.

Ironically, many alarmists subscribe to broadband services like DSL or cable, so they're already familiar with the concept of paying more money for faster packet delivery. For some reason, they can't extrapolate the concept to the core of the network. They accuse me of sucking up to the big telecom corporations, but they're OK with subsidizing big corporations like Google, Microsoft, and Yahoo, which consume huge amounts of Internet bandwidth at no extra charge to you or me.

Worst of all, I know that many network neutralists will soon be subscribing to services such as Internet telephony, streaming video and audio on demand, and live teleconferencing. Without priority packet handling, all those services suffer from annoying dropouts and stalled connections. Mark my words: The same folks who object today to tiered Internet service will someday scream for it.

Consider this: Since 1999, I've been writing about network processors—specialized microprocessors designed for packet processing in routers and other network equipment. Guess what? All these chips have special hardware for quality-of-service (QoS) processing, which means identifying certain packets that should receive priority handling. From the beginning, virtually all network processors have been designed to support tiered service.

In some places, tiered service is already a reality; it's just invisible. Soon it will be the norm, whether you like it or not. The only question is whether Congress lets the telecoms charge the bandwidth hogs premium rates for priority service, or whether the hogs get a free ride, subsidized by the Little People.

Don't be a neutrality nut. Do you really believe that the big companies betting billions on real-time Internet services will allow your tiny text-messaging packets to interrupt their gigabit data streams? Dream on. They will get priority service, whether they pay for it or not.

Tom Halfhill was formerly a senior editor for Byte magazine and is now an analyst for Microprocessor Report.

GAME THEORY



THOMAS
MCDONALD

Viva Las Vegas

What happens in Vegas... rarely ever results in a gruesome death. At least that's the message Las Vegas Mayor Oscar Goodman wants to get across. As if he doesn't have enough of a problem with the television show *CSI* piling up a huge weekly body count in his fair city, now he has to contend with Ubisoft's upcoming tactical shooter *Rainbow Six Vegas*, in which terrorists launch attacks on the city.

The Mayor hadn't seen the game (or even its trailer) when he offered these thoughts to the *Las Vegas Review-Journal*: "[The game] could be harmful economically, and it may be something that's not entitled to free speech [protection]. It's based on a false premise. I will ask... whether or not we can stop it."

Not surprisingly, the first issue he mentions is economics. In other words, this is all about money. In Mayor Goodman's world, when money and free speech clash, the First Amendment can grab its ankles. Vegas has spent millions cultivating an image as a place where people can wallow in sin without consequences, while at the same time attempting to sell itself as a sort of desert Disneyland and family destination. All this is in a city built and permeated by organized crime. That's an astounding PR stunt to pull off, and it didn't come cheap.

Even more laughable is the Mayor's notion that an attack by terrorists on America's number one symbol of sinful behavior and carnal excess is somehow "based on a false premise." I'd say it's based on simple probability.

Certainly, the game's trailer is shocking in all the right ways for gamers and all the wrong ways for civic leaders. With masked gunmen firing into casinos, bullets zipping by slot machines and roulette wheels, terrorists taking people hostage, helicopters disgorging special ops teams in the middle of the strip, and the imposition of martial law, it's the kind of scenario that gives law enforcement personnel the night sweats.

It's also the kind of image Mayor Goodman doesn't want associated with his city. Whether he'll get his way or whether he's left shouting "Do you know who I am? I'm Moe Greene!" into an empty courtroom remains to be seen.

Tom McDonald has covered video and computer games for 16 years. He lives in the New Jersey Pine Barrens.

Sony Delivers the Blu-ray Goods

It's still pricey, but Sony's entry into the HD optical market bodes well for the format

This month (on page 82) we knock Pioneer's first-gen Blu-ray drive for not being able to read or write to CDs. The drive also doesn't include any movie-watching software, and it costs \$1,000. It's not a good introduction to the much-anticipated Blu-ray format.

That's all about to change, however, as Sony has announced its Blu-ray contender—the BWU100A. Though it costs a cool \$750, it has everything you could want in a Blu-ray drive. It can read and write to every single format ever conceived, including DVD, CDs, and even the obsolete DVD-RAM format. It also supports double-layer 50GB Blu-ray discs—a feature not found on the Pioneer drive. Perhaps most importantly, it includes Blu-ray-



Sony's upcoming Blu-ray drive is pricey, but supports every next-gen feature available.

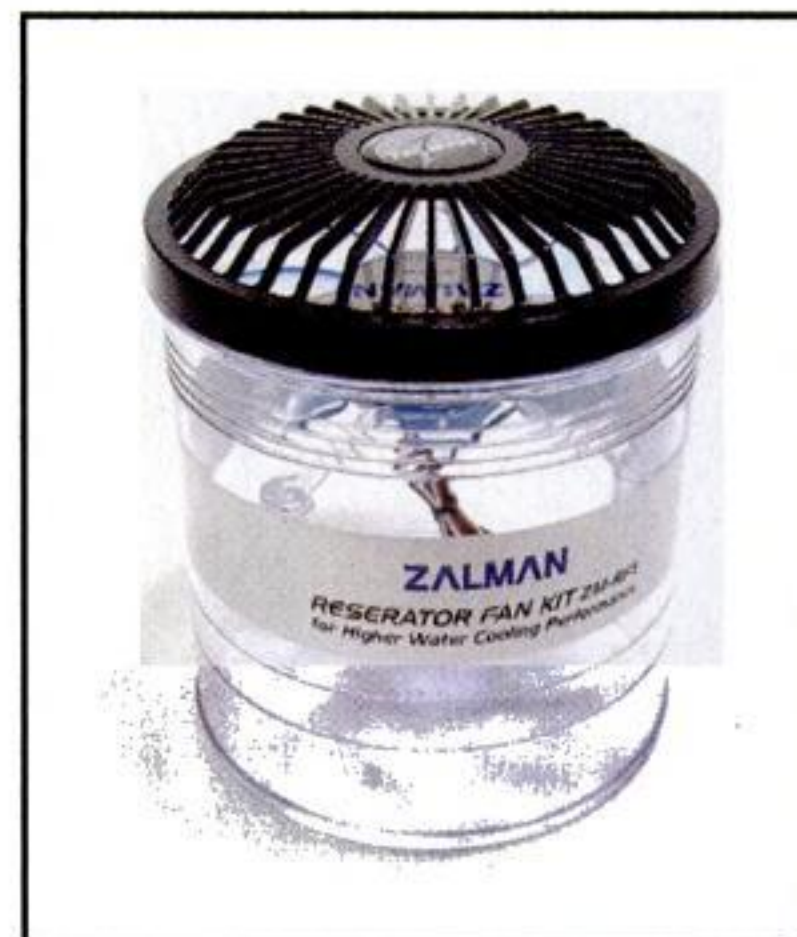
capable *Cyberlink* movie-watching software. It's still crippled by DRM, but that's next-gen optical for you.

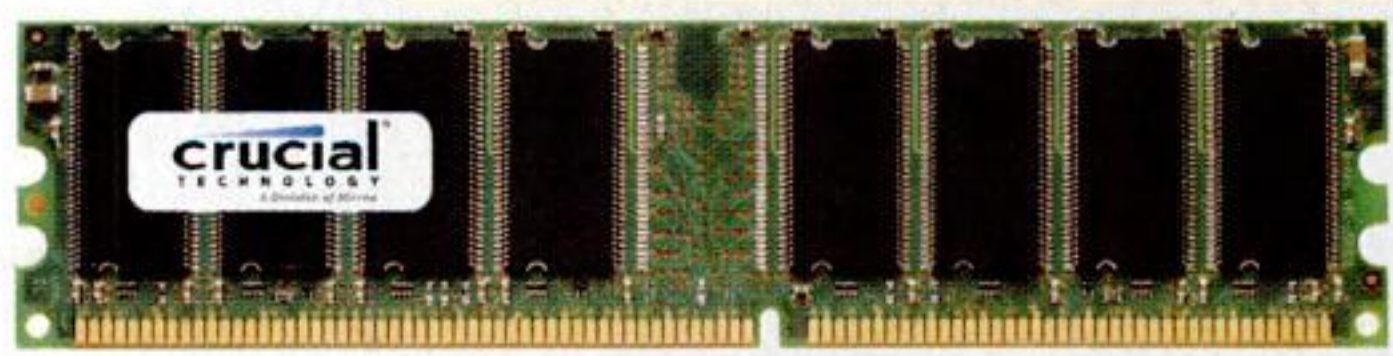
Zalman ZM-RF1

The Zalman ZM-RF1 sits on top of the normally passive Reserator water-cooler and pushes air down over the fins using an adjustable-speed 14cm fan. It adds a little bit of cooling and a lot of noise. During testing, the cooling-hat dropped temps a whopping 2 C when the fan was turned up all the way. Big whoop, we say. \$35, www.zalmanusa.com

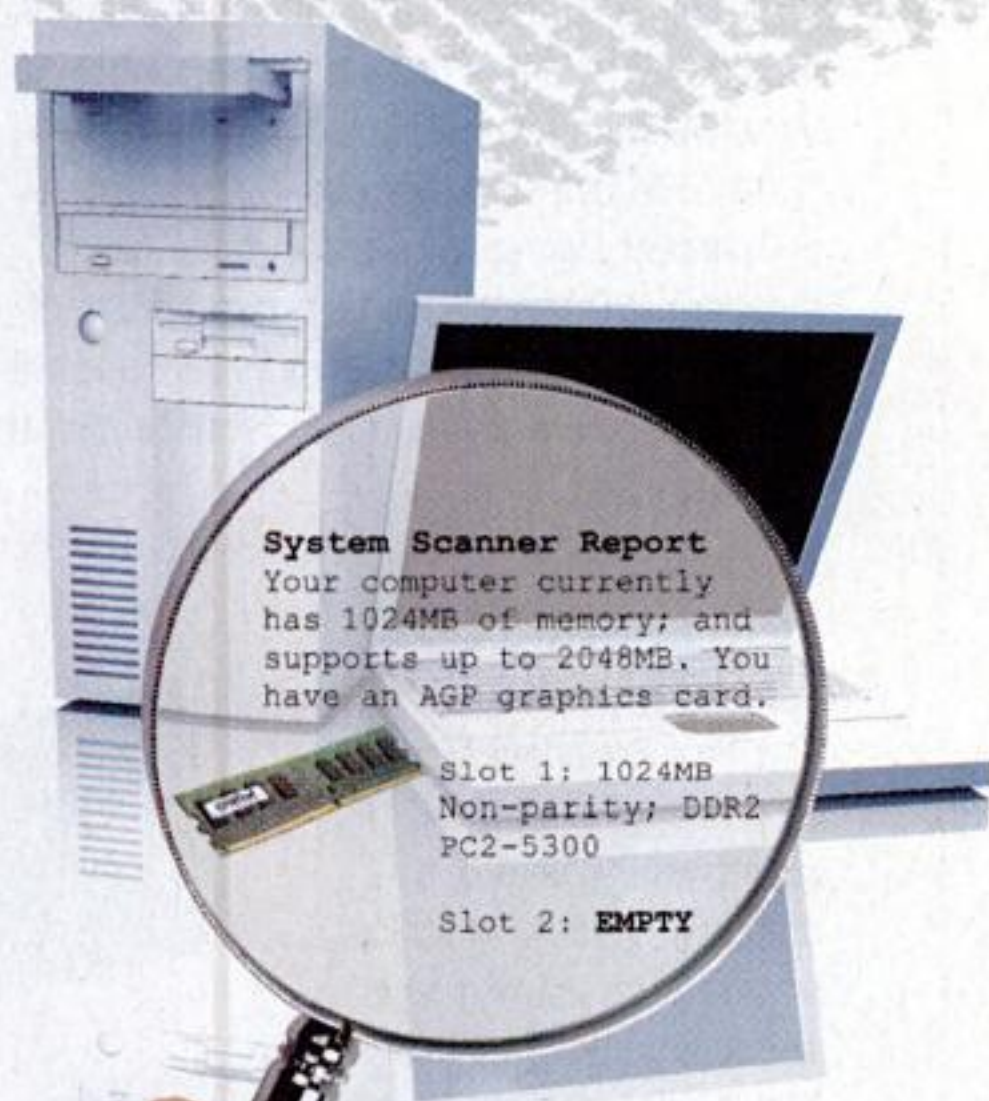
If you want to add a fan and some noise to your fanless, silent Reserator, the ZM-RF1 is the perfect product for you. And did we mention it's ugly, too?

TESTED &
GEEK
DISAPPROVED





MEMORY MYSTERY SOLVED, CASE CLOSED.



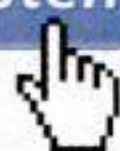
System Scanner Report
Your computer currently has 1024MB of memory, and supports up to 2048MB. You have an AGP graphics card.

Slot 1: 1024MB
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PC2-5300

Slot 2: **EMPTY**

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Unified Flash Memory Standard in the Works

New technology combines the speed of DDR memory with the durability of flash

A brand-new memory standard is being developed that could fuse the best features of today's various types of memory into a single technology. It's called magnetoresistive random-access memory, or MRAM for short, and will deliver lightning-fast speeds while being nonvolatile—when (and if) it comes to market.

The impetus for the new technology is that the memory market is divided into two camps, and neither is perfect. There's volatile memory, which we use in our PCs (DDR 400, for example), which is wicked fast but loses all its data when the power goes off. There's also nonvolatile flash memory, which is used in devices that need to retain data when the power's off, such as cellphones and USB keys. The problem with nonvolatile memory is that it's incredibly slow, at least com-



MRAM is purported to be as fast as PC memory (above), while being nonvolatile like flash memory. Yummy.

pared with the memory in our PCs. Flash memory also degrades over time, and has a finite lifespan.

Though MRAM will initially be used in industrial applications, it might someday replace the memory in PCs. This would allow instantaneous booting and standby, because the memory could retain information when the power is off.

Blu-ray, HD-DVD Drive on the Way



Nobody likes having to choose one optical format over another, and it seems Ricoh has developed a solution to please everyone—a disc drive that reads everything, Blu-ray, HD-DVD, DVD, and CD; the works! Even more incredible is that Ricoh's optical component does it all with one laser and one pickup.

Get Ready to Wear Your Motherboard

Those crazy cats at the University of Wisconsin-Madison have developed a flexible PCB (printed circuit board), which will open the door for mobos that wrap around a computer case, or shirts with CPUs in them.

The researchers developed the capacity to literally shave the top layer off a traditional PCB, removing it from the substrate it's built upon. This thin layer is only a few hundred nanometers thick. Though it's too thin to be used as a stand-alone PCB, it can be transferred to a wide array of materials, including glass, plastic, or other flexible surfaces. Even better, it can be flipped upside down, and have a second flexible PCB attached to its backside—something that's impossible with today's PCBs. Researchers say they can stack many of them on top of each other, creating a big silicon sandwich.

The silicon used in this PCB is known as "strained silicon," which is what Intel has used on all of its CPUs since the introduction of its Prescott core.

FUNSIZE NEWS

GOOGLING BECOMES OFFICIAL

Though Google is the name of a search engine, and thus a noun, it's also a verb—officially. In the most recent version of the Merriam-Webster dictionary, the word "google" is listed as a verb, meaning: "To use the Google search engine to obtain information on the World Wide Web." One other new addition to the dictionary is the phrase "mouse potato"—we know a few of those.



DELL AND AMD, RUMOR #1123

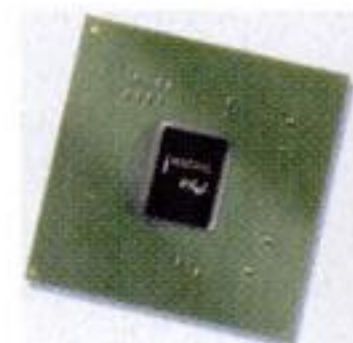
Rumors that Dell would sell AMD-based desktops have appeared repeatedly over the years, but with no substantiating evidence. This month, however, there is a report in the *Commercial Times* of China that Taiwanese companies who supply Dell with parts have received orders for desktop PCs using AMD processors. Maybe this time it's for real? We doubt it, especially given the recent arrival of Core 2 from Intel.

WD GETS BIT

Western Digital has settled a class-action lawsuit over how it labels its hard drives' capacities. The lawsuit claims WD is being deceptive, as a 250GB drive's capacity is a mere 231GB after formatting. It's an age-old problem: The drive manufacturers use the decimal megabyte (1,000,000 bytes) to describe drive capacity, while Windows uses the binary system (1,048,576 bytes) to describe it. This causes a 7 percent discrepancy between the two numbers. WD has ponied up a free version of its Dantz backup software, worth \$30, and will warn consumers on future box labels about the capacity issue.

EPIC LASHES OUT AT INTEL GRAPHICS

Epic Vice President Marc Rein is mad at Intel for selling motherboards with crappy integrated graphics. Intel sells so many mobos with integrated graphics that it's the market-share leader in graphics shipments. This is not good for gaming, says Rein, since integrated graphics can't run any high-end PC games—notably Epic's *Unreal Tournament 2007*. Intel's response is that it "...has never positioned integrated graphics for the hardcore gamer."

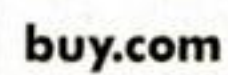


It's different here, dude

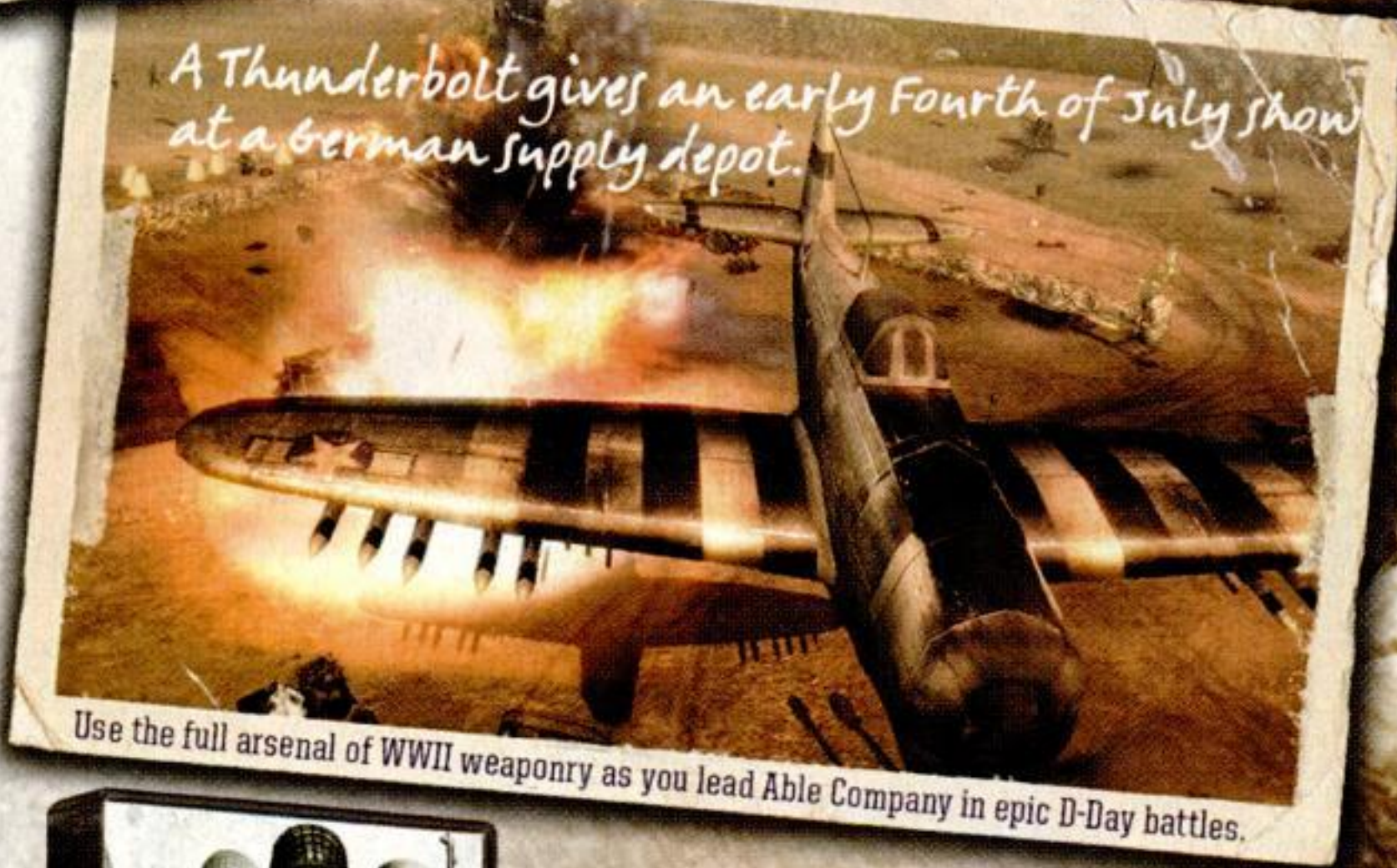


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HIGH-END CPUs

Intel Core 2 Extreme **vs.** AMD Athlon 64 FX-62

If you read our September 2006 Dream Machine feature you already know about Intel's shockingly fast Core 2 Extreme X6800 CPU.

Based on the company's new Core microarchitecture, the C2E (and its Clark Kent alter ego, the Core 2 Duo) marks Intel's return to a "brainiac" design that emphasizes performance per clock rather than insanely high clock speeds (as characterized by the Pentium 4). In a nutshell, the X6800 is "wider, faster, and cooler." It's wider because its microarchitecture is designed to process four instructions per cycle (versus three in the P4 and Athlon 64.) Faster describes the Core CPU's ability to process a 128-bit SSE instruction in a single cycle instead of the two cycles its contemporaries require. And it's designed

to run cooler than its smoking-hot predecessors.

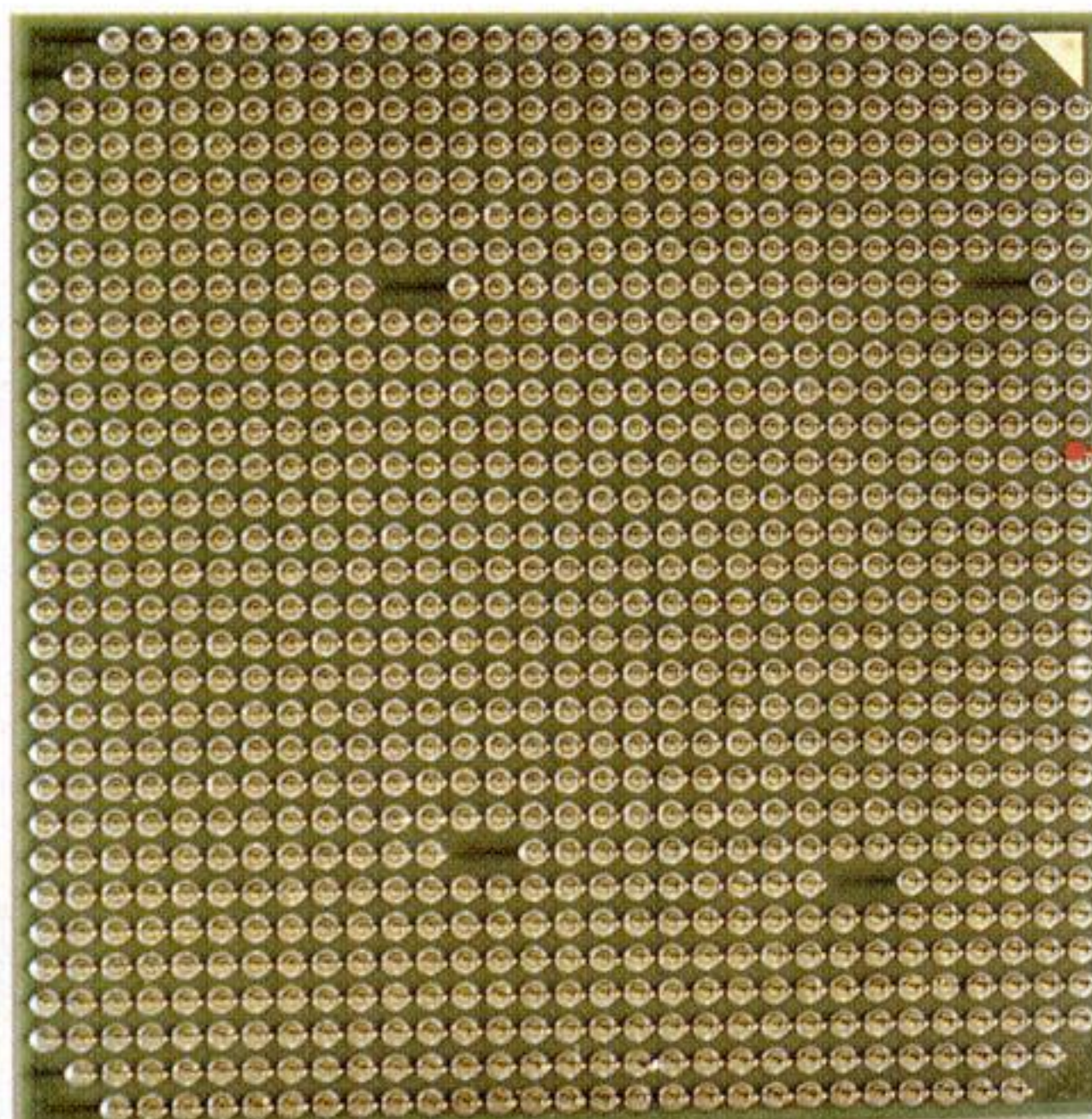
AMD, meanwhile, is betting that its stellar K8 microarchitecture and the elegant design of its Hyper-Transport links as well as its on-die memory controller—something Intel still lacks—will help the company remain the bad boy of computing. The latest Windsor core AM2 chips upgrade the memory controller from Socket 939's DDR support to DDR2/800 RAM.

To help you in your next PC buying or building decision, we weighed the costs and measured the benefits of both AMD's and Intel's top-of-the-line procs.

BY GORDON MAH UNG

round 1**MOTHERBOARD AND CHIPSET SUPPORT**

AMD's Socket AM2 support is rolling along quite well for the DDR2 versions of the Athlon 64, and even better, there's no damned confusion. Any AM2 processor should work in any AM2 motherboard. Board support for the Core 2 Extreme and Core 2 Duo is still in its infancy. We've seen only two shipping boards with Core 2 Duo/Extreme support thus far: Asus' P5W DH Deluxe (reviewed on page 84) and the "304" version of the Intel D975XBX. Of course, consumers will have a tough time figuring out which boards are the 304 version. **WINNER: ATHLON FX-62**



ATHLON 64 FX-62
\$1,030, www.amd.com

round 2

FEATURES The Athlon 64 supports SSE, SSE2, SSE3, NX, and of course, 3DNow!, 3DNow! Professional, and AMD64. The Core 2 Extreme includes SSE, SSE2, SSE3, NX, Intel's version of AMD64 (known as EM64T), and the new SSE4 instructions. This alphabet soup really means that when it comes to enhanced instruction support, both CPUs are pretty equal.

Sure, only the Core 2 Extreme has SSE4, but that won't be an issue for some time. The only features that matter today are SSE1, 2, and 3, AMD64, and NX support.

Of course, there are a ton of potential features that may or may not ever materialize, and no one's talking about them. According to rumors, AMD snuck in the ability to make both cores in a dual-core proc look like a single core to an application that cannot take advantage of dual-cores. Is it there? There's no way to know. We do know, however, that Intel mysteriously had support for Core Multiplexing Technology in Core 2-compatible chipsets, and then quietly removed it from BIOSes. Is CMT the same approach AMD is taking? We just don't know. For now, we're calling it a tie, but moves by either camp could dramatically shift the balance. **WINNER: TIE**

round 3

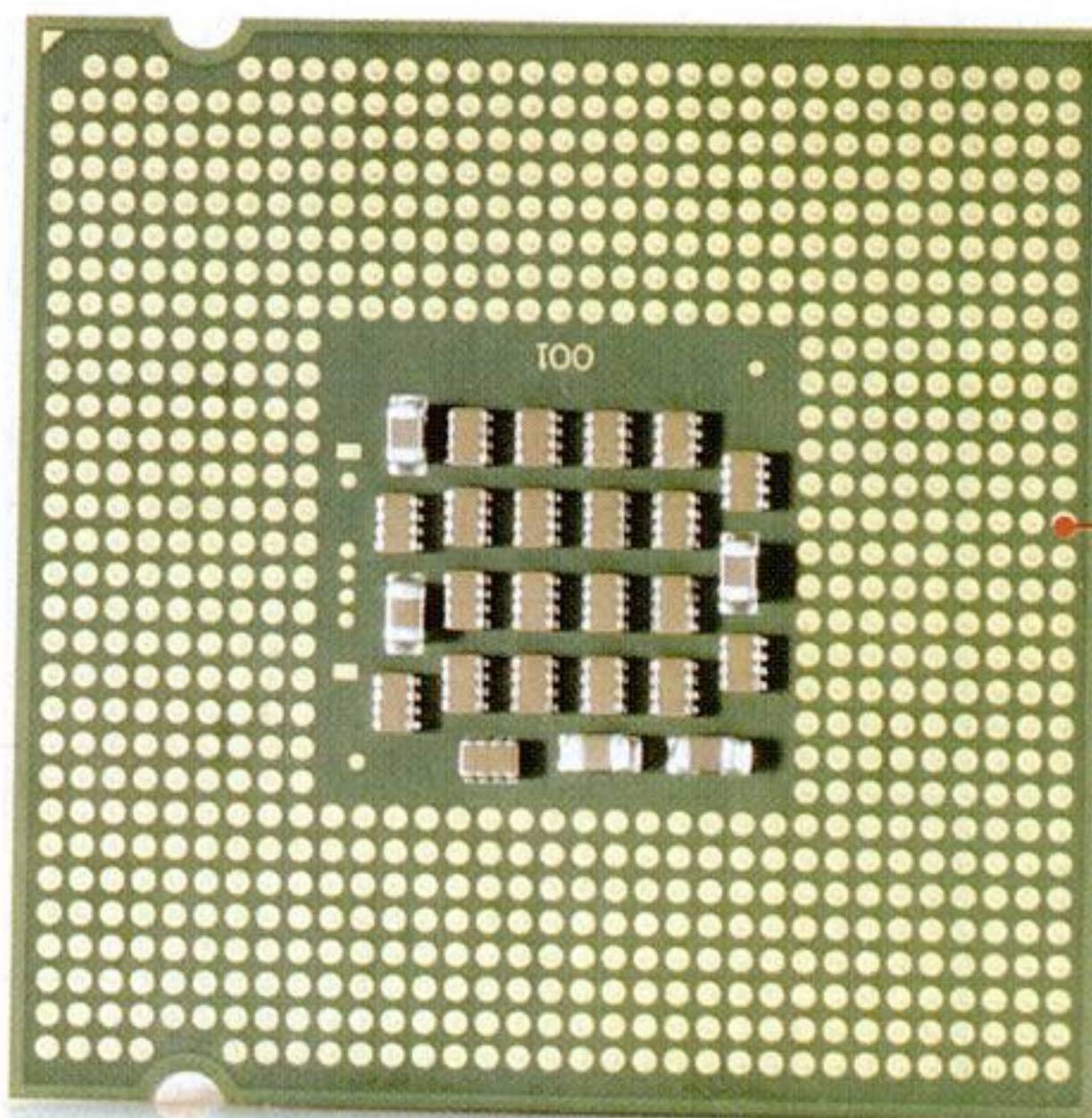
THERMALS Intel's big breakthrough with Conroe is in thermal profiles. The dual-core Pentium D and Pentium Extreme Editions ran hotter than pocket fusion reactors, but Core 2 Duo and Core 2 Extreme are exactly the opposite. Although our own testing finds that C2D and C2E aren't quite as cool running as we initially hoped, the chip is fully capable of running hours on end under full load with the heatsink fan unplugged. The Athlon 64 FX-62 is a fairly cool-running proc too, but we'd be afraid to run it without the heatsink fan turned on.

On paper, the Core 2 Extreme X6800 is a 75W CPU while the Athlon 64 FX-62 is 125W chip. The caveat is that both companies rate their thermals differently. Intel's rating tends to reflect performance in the real-world, while AMD's describes the worst-case scenario. Still, our hands-on experience suggests that the Core 2 Extreme X6800 is more immune to heat. **WINNER: CORE 2 EXTREME**

round 4 PERFORMANCE This is the category that should matter most to a *Maximum PC* reader, and there are no surprises here: The Core 2 Extreme X6800 is the fastest CPU in town, the state, and the whole freaking world right now. Not that the Athlon FX-62 is a bad chip, it's just slower than Core 2. Pit it against a Pentium 4 and it delivers the same kind of smackdown that it gets from the new Core 2 Extreme. The Core 2 Extreme X6800's performance advantage is so shocking, you'll have to turn the page to see the benchmark results for yourself. **WINNER: CORE 2 EXTREME**

round 5

PRICE The two procs are priced almost identically, with the Athlon 64 FX-62 running \$1,030 and the Core 2 Extreme X6800 hitting \$1,000. But when you factor in the superior performance of the C2E, you'd be a fool to spend your CPU bucks on anything but Intel. **WINNER: CORE 2 EXTREME**



INTEL CORE 2 EXTREME X6800
\$1,000, www.intel.com

SPECS

	ATHLON 64 FX-62	CORE 2 EXTREME X6800
CLOCK / CORES	2.8GHz dual core	2.93GHz dual core
SOCKET	AM2	LGA775
MEMORY SUPPORT	DDR2/800	Chipset dependent
L1 SIZE	128KB	64KB
L2 SIZE	2MB per core	4MB shared
TRANSISTOR COUNT	227.4 million	291 million
DIE SIZE	230mm ²	143mm ²
THERMAL DESIGN POWER*	125 watts	75 watts
PROCESS	90nm DSC SOI	65nm
CORE CODE-NAME	Windsor	Conroe
PRICE AT LAUNCH (PER 1,000)	\$1,030	\$1,000

*AMD and Intel use different methods to determine TDP ratings.

The Results

To test the two CPUs, we used two different but similar platforms. For the Athlon 64, we used an Asus M2N32-SLI motherboard with the nForce 590 SLI chipset, a Western Digital WD4000KD SATA hard drive, 2GB of Corsair DDR2/800 EPP RAM, and a single GeForce 7900 GTX card. For the Core 2 Extreme, we used an engineering sample motherboard based on the nVidia nForce 590 SLI Intel Edition chipset, and the exact same Western Digital WD4000KD drive, RAM, and videocard as the AMD platform. We loaded both systems with a fresh install of

Windows XP Service Pack 2 and used identical graphics drivers on both platforms. In gaming tests, we ran the benches at very low resolutions to take the graphics card out of the performance equation. For our other tests, we selected applications limited mostly by the CPU performance. In our *Adobe Premiere Pro 2.0* test, for example, we take high-definition video, then we edit it, apply a ton of transitions, and encode it to WMV. It's all about the CPU with these tests.

BENCHMARKS

	2.93GHZ INTEL CORE 2 EXTREME X6800	2.8GHZ AMD ATHLON 64 FX-62	PERFORMANCE DIFFERENCE
3DMark2001 SE overall	47,160	35,723	32%
3DMark06 overall	6,386	6,138	4%
FEAR at low resolution (fps)	321	213	34%
Quake III at low resolution (fps)	876	578	34%
Premiere Pro 2.0 HDV MPC test (sec)	1,920	2,676	39%
Photoshop CS2 MPC Action Script (sec)	207	278	34%
Bible Pro 4.7 RAW Conversion (sec)	454	773	70%

Best scores are bolded.

And the Winner Is...

CPU shootouts in the last few years have been tricky to judge. While one CPU will often take the overall series of tests, there's usually a program or two that favors one microarchitecture over the other. For example, in the synthetic *PC Mark 2005* (which we do not use), the dual-core Pentium Extreme Editions usually fare better despite the preponderance of real-world tests that favor the Athlon 64. But here, it's a clean sweep of the benchmarks, with the **Core 2 Extreme X6800** taking every CPU-intensive benchmark by a huge margin. The small-

est gap we saw was in *3DMark06*, which is a GPU test even at low resolutions. For the most part, we saw the Core 2 Extreme X6800 best the Athlon 64 FX-62 by about 30 percent—although in *Bible Pro* we saw an incredible 70 percent difference. These dramatic performance deltas translate into less time spent waiting on your PC. In the modern processor wars, a performance gap this large is unheard of. Clearly, the Core 2 Extreme X6800 is the superior chip. We don't know how long Intel's lead will last, but the king has definitely returned. **MPC**

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READY TO BE PHARMED?

Everyone with a pulse knows not to open "phishing" email that claims your PayPal, CitiBank, or eBay accounts have been compromised, right? Well scammers are working on new methods to rip you off. A report on News.com indicates that scammers are now phoning consumers directly to try to gain access to their financial and online accounts.

The technique isn't new. Black-hat hackers and private dicks have long used the art of "social engineering," or pretexting, to trick people into giving them confidential information, but these phone phishermen are applying a new spin by using scammed voice over IP (VoIP) accounts to set up phone banks by which to hit consumers. While most people would never divulge information in an email, an authoritative voice that claims to be from your bank can work an amazing Jedi mind trick on you.

How do you avoid being scammed? Avoid giving out your private information. Period. And remember, your bank already knows your credit card number and PIN, so why would it ask for it?

If you're suspicious, tell the person that you would rather call the institution he or she claims to work for. Of course, verify that the number you're calling is the bank first. The numbers are usually on the back of your credit cards.

The Anti-Phishing Working Group (www.antiphishing.org) is also warning of the growing risk of pharming—a dangerously insidious way to rip you off. Most people know to not click links in email and to instead type the URL directly into the browser as a way to avoid being scammed, right? But what if your computer's hostfile has been hijacked by malware that redirects you to another site? You typed the URL for your bank into your browser, and it appears that you're at the your bank's homepage, but your computer actually redirected you to a cloned site of your bank, where it's hoped you will blithely enter your account and password info. If the scammers are working it, they might even ask for more personal data than normal

because you think you're on a real bank site. Ahh, but what if you keep your PC in pristine condition, completely free of Trojans, worms, and viruses, and you decapitated and dumped the body of ActiveX in the ocean?

That doesn't help if your router has been hijacked wirelessly. If the router's DNS entry gets pointed away from your ISP to a DNS server under the control of the scammer, you'd never know it. Even worse, there's been chatter of several attempts to "poison" DNS servers into redirecting traffic from certain sites such as your bank—something you could never detect on your end easily. So how do you know you're at the site you typed into your browser? If your bank uses server certificates, your browser should know if that certificate is suddenly missing or changed.

It's enough to make us want to go back to the checkbook and mailman method. Woof.

THINKPADS USE PROPRIETARY HARD DRIVES?

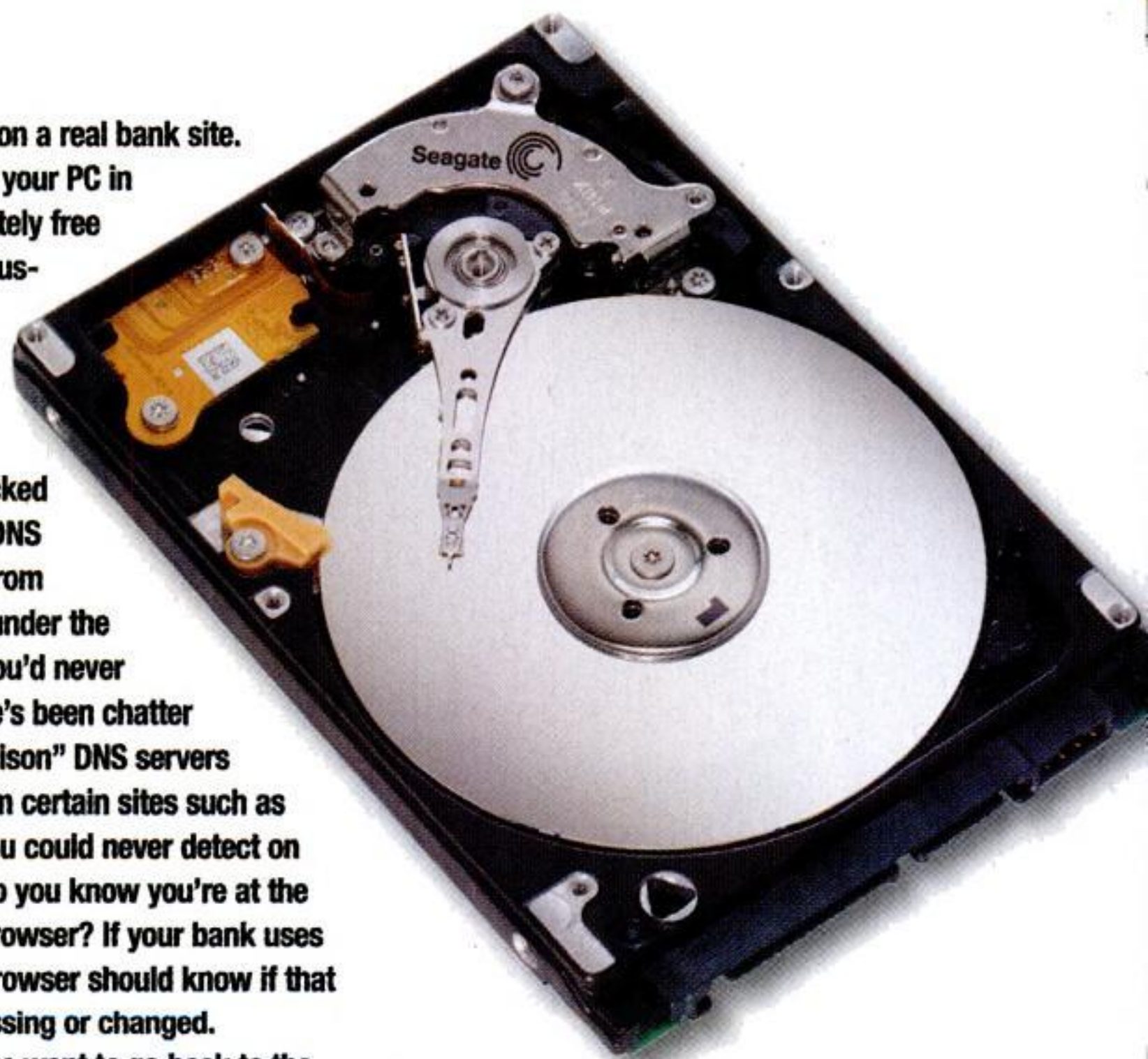
I work for a large corporation that purchases thousands of IBM/Lenovo Thinkpads a year. Our current model is the IBM T43 model number 18714AU, which comes with a 40GB drive. That configuration works for most folks, but about 10 percent want bigger drives. We obtained some Seagate 160GB hard drives, and much to our dismay, the drives generate a POST error 2010 because they're not certified by IBM. After pressing Escape to clear the message, the notebooks and new drives work fine.

Lenovo has since updated the BIOS so it still gives the error but the notebook boots without stopping. It's still annoying to the user and there is always speculation that it will fail because of the so-called "incompatibility." We've had success when we tested these drives in Dell, Toshiba, and Apple notebook computers—why not IBM/Lenovo? Seagate's tech support said the problem is with IBM/Lenovo. So now we have these expensive drives sitting

around, the users get smaller drives or different laptops, and it's double the work for us.

How does IBM/Lenovo get away with this kind of behavior?

— Jeff



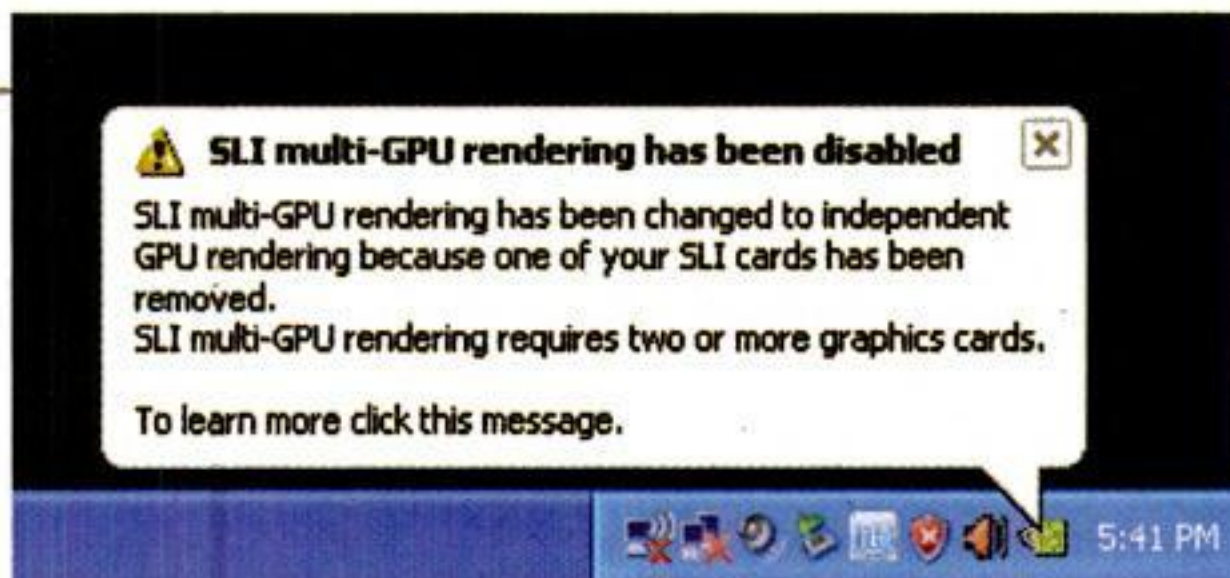
IBM/Lenovo's T43 notebook displays a 2010 error when Seagate 160GB hard drives are installed, causing concerns about proprietary parts.

Proprietary hard drives? What's next, a monitor with advertisements that flash across the top? To get to the bottom of this mess, the Dog pinged Lenovo who assured us that it isn't any dark conspiracy to get consumers to purchase hard drive upgrades directly from Lenovo. The problem, the company said, lies with the serial ATA-to-parallel ATA bridge chip that the T43 notebooks use. The bridge chip apparently looks for information from the hard drive manufacturer and when it can't find it, it gives the 2010 error: "Warning: Your internal hard disk drive (HDD) may not function correctly on this system. Ensure that your HDD is supported on this system and that the latest HDD firmware is installed. Press <Esc> to continue."

Lenovo said there's a slight risk of data corruption, so it recommends that consumers obtain a firmware update from the hard drive vendor. The BIOS update just bypasses the error. Lenovo/IBM's website has three work-arounds: No. 1: As mentioned before, get a firmware update. No. 2: Buy



Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing watchdog@maximumpc.com. The Dog promises to answer as many letters as possible, but only has four paws to work with.



A bug in one of nVidia's drivers tells you at every boot that SLI is turned off—even if you don't have SLI or your motherboard can't run it.

another hard drive that is "supported" by the T43. No 3: Use the drive in a drive-bay adapter that slips into the optical slot of the machine. (That's not exactly optimal if you want to use the hard drive as your primary drive and you also want to burn DVDs.) The Dog thinks Lenovo forgot option No 4: Switch notebook PC brands. Woof.

DRIVER DECEPTION?

While we're on the topic of conspiracies to push brands and hardware: Some folks are wondering if there was gorilla marketing at work when nVidia released the 91.31 drivers for its GeForce cards. When the new drivers from nVidia's website were installed, a message appeared saying: "SLI has

been disabled." The message pops up for people who intentionally have SLI disabled for multi-monitor work, as well as for people who don't have second cards installed, and even for people whose motherboards don't support SLI.

On a new Core 2 Duo/Intel 975X machine, for example, the Dog ran into the message with a single GeForce card. It would not go away until a second GeForce card was installed—but, of course, the 975X doesn't support SLI.

When the Dog questioned nVidia reps, he was told there's no conspiracy, just a pesky driver bug.

"Several users have commented about a pop-up message from the toolbar that says: 'SLI multi-GPU rendering has been disabled.' A driver bug resulted in this message appearing on PCs at every reboot. We fixed this bug in a new driver that has been available on nZone.com since June 29. We apologize for the inconvenience."

You can download the new driver at www.nzone.com/object/nzone_downloads_rel70betadriver.html. **MPC**



(newbie)



(alpha geek)

Recall Alert

Normally, it's batteries and power supplies that set the world on fire, but Lexar is recalling 66,000 USB JumpDrive thumb drives that pose a burn hazard. The company said some of its JumpDrive FireFly II and Secure II products might overheat, posing a risk of burns to consumers and property damage. On the Secure II drive, look on the unit for the part number. If it says JDSE1GB-00-500 Rev H and the part number is 3052-1GBA-2006, 3052-1GBA-2106, 3052-1GBA-1906, or 3052-1GBA-1806, the drive is part of the recall.

To tell if your FireFly II is part of the recall, you can look on the back of the retail package it came in for the part numbers. If it shows the part number JDFF256-431RU, JDFF512-431EM, JDFF1GB-431TO, JDFF2GB-431BK, JDFF256-445RU, or JDFF256-264, the drive poses a risk. If you no longer have the packaging, you can look on the drive itself for the hardware part number and PCBA Part number. In the table here we show you the number combinations of the suspect drives. Both numbers must appear on your product; so, for example, a FireFly II with JDFF1GB-00-500TO and 3791-1GBA would be on the recall list.



Some Lexar JumpDrives could overheat and pose a burn hazard.

HARDWARE PART NUMBER	PCBA PART NUMBER
JDFF1GB-00-500TO	3791-1GBA 3792-1GBA 3793-1GBA
JDFF256-00-500RU	3791-256A 3793-256A
JDFF256-00-500VI	3791-256A 3793-256A
JDFF2GB-00-500BK	3792-2GBA
JDFF512-00-500EM	3791-512A 3793-512A

FireFly II drives must have both sets of part numbers to be part of the Lexar recall.

If you have one of the affected drives, you can return it for a refund, replacement, or store credit where it was purchased. Lexar notes that individual stores might apply their own refund or return policies. Individuals can also exchange the unit directly with Lexar. You can call Lexar at 1-800-248-2798, 24 hours a day, if you need more information, or visit www.lexar.com/jdrecall/index.html for more information.



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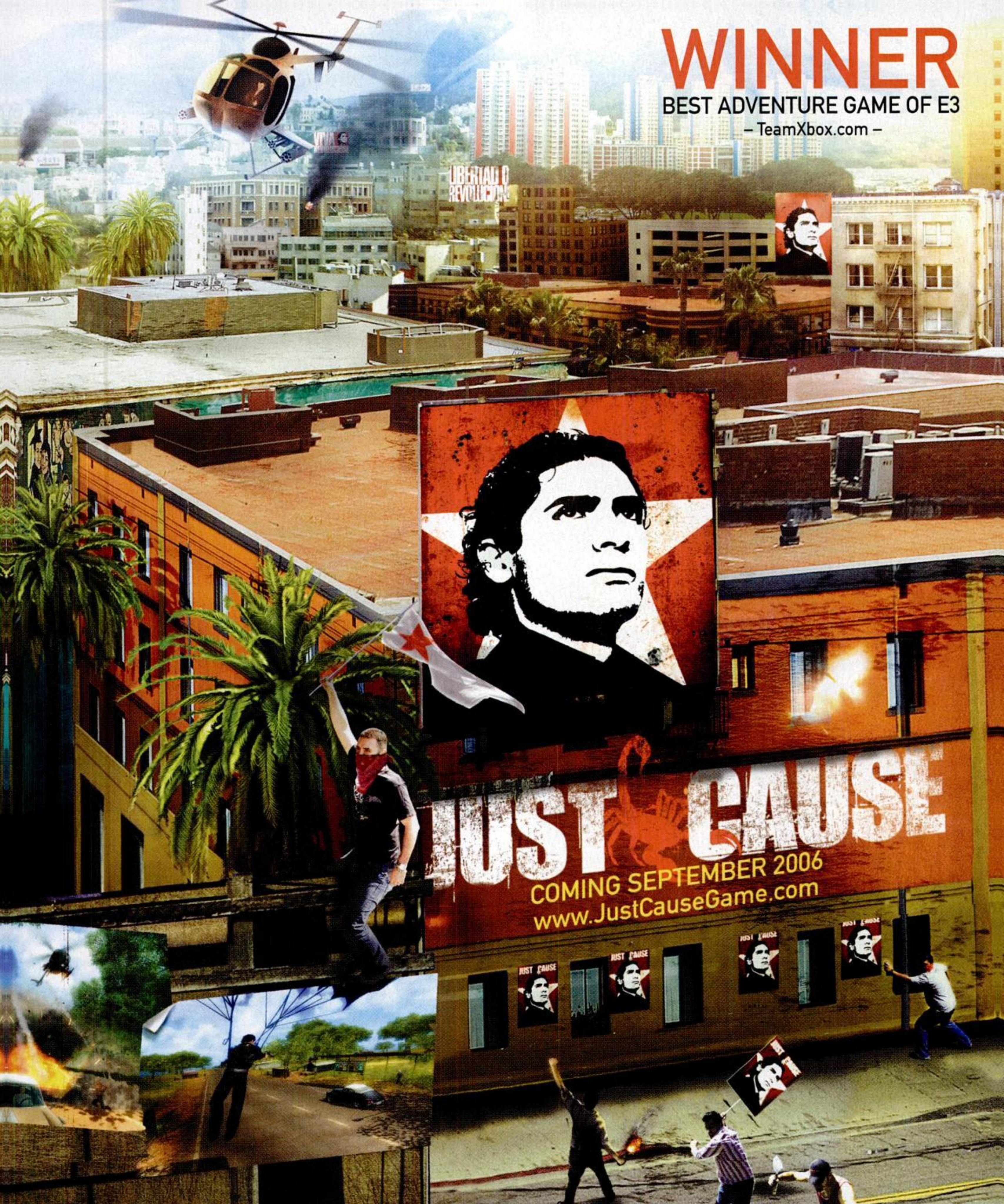
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BEST ADVENTURE GAME OF E3

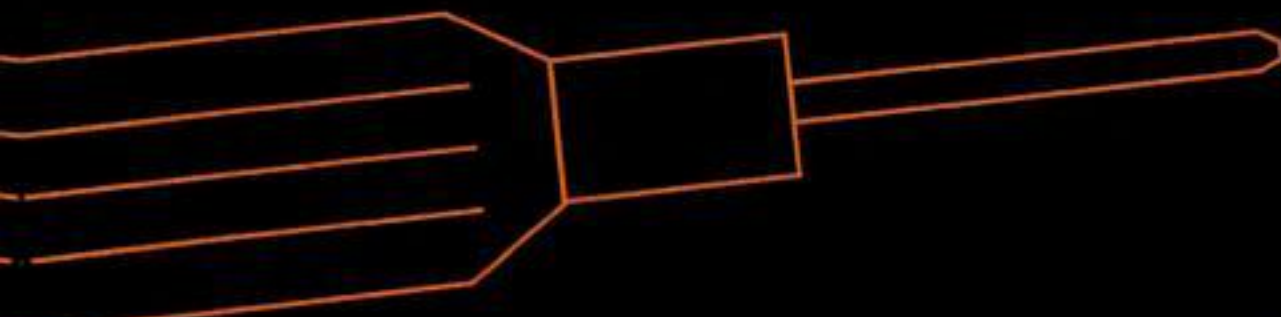
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BUILD THE ULTIMATE HOME THEATER PC

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BY MICHAEL BROWN & THE MAXIMUM PC STAFF

There comes a time in every young lad's life when he outgrows his personal video recorder (PVR). Tivo, you've been with us for a long time, but we've grown, and you just haven't. We want to do more with our TV than you're capable of. We want to rip all our DVDs to the hard drive, and then stream them across the network to all of our portable players. Sure, you can do that, but it can be done better.

Yes, we're going to miss your friendly round remote, but we haven't really used that since we got our Harmony remote anyway. And we can't wait for our entire 30,000-song music library to be available at our fingertips! Heck, we'll even be able to play a game or two on our media center.

Here's the trick: If you pair an inexpensive TV tuner or two with a decent remote, quiet cooling apparatus, and midrange PC components, you can build a living room PC that positively spans the world's best PVRs. The time has come to move beyond Tivo, and step into the larger, more powerful world by building your own living room PC!

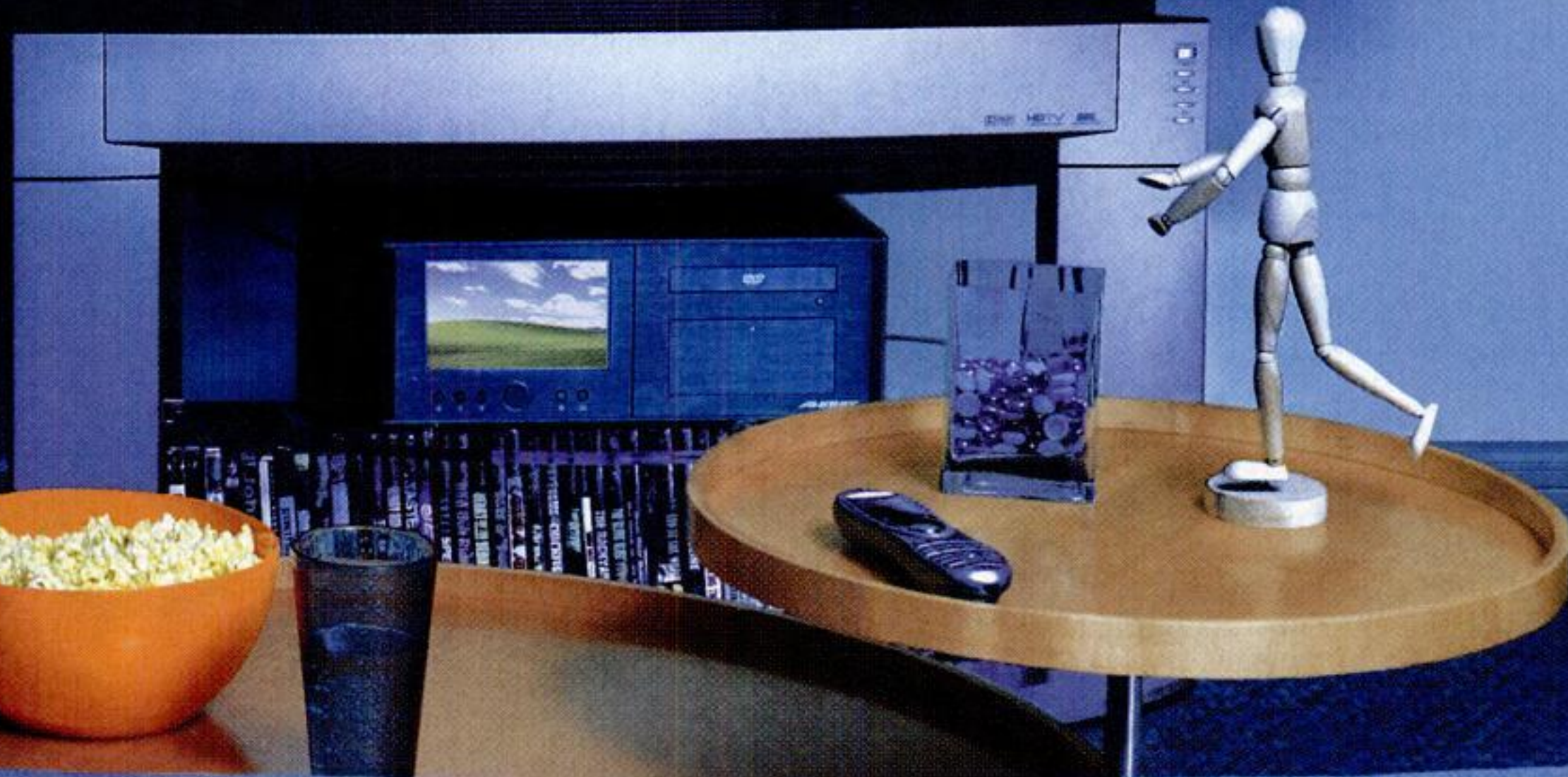
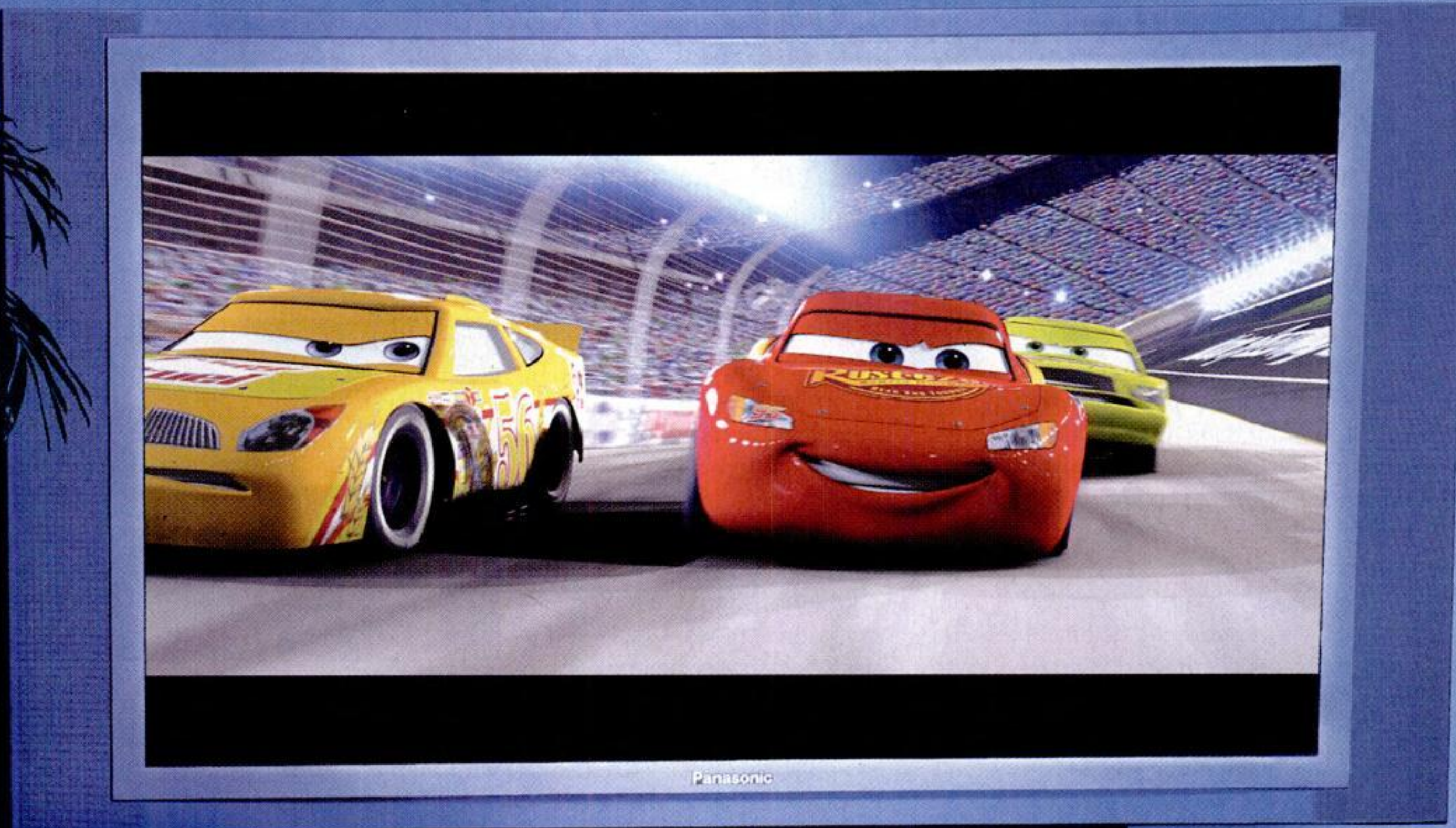


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KEY HOME-THEATER COMPONENTS

We're building a different type of computer here, so rounding up the usual suspects just won't cut it. We need to walk the razor's edge between cool-running and smoking-fast performance. Here are our recommendations for the right parts to build a great living room PC, based on our hands-on experience.

TV TUNERS

We looked at a ton of different standard-definition TV tuners, and realized one very important thing: USB tuners are too resource intensive to use if you want to record from multiple sources at the same time. So we focused our search on internal PCI TV tuners.

Typically, the major differentiation points among TV tuners are the quality of the bundled software (which we don't care about, as we're using stand-alone PVR software) and image quality, although differences in image quality are much less apparent than they were even five years ago. The rise of Windows XP Media Center Edition has forced all of the TV tuner vendors to provide a higher standard level of hardware, including hardware MPEG-2 encoding.

A recent trend has hardware manufacturers packing multiple tuners on a single tuner card. Even if you're going to pull your signal from a cable or satellite tuner, having multiple tuners is the only

way you can record multiple shows simultaneously.

Then there's the HDTV situation. Currently, the only way to capture an HDTV signal is to hook up an antenna and pull the signal over the air. Unfortunately, you can't really capture HD from the most common sources—cable and satellite decoder boxes. We expect that will change when (and if) CableCard-ready tuners begin shipping. With the CableCard, you'll be able to insert a simple device in your PC, which will be configured to work directly with your provider—at least if Microsoft and the providers don't screw up the devices with Draconian DRM schemes.

So, which tuner should you buy? The Hauppauge PVR-250 is the safest recommendation. It's compatible with everything—including *MythTV*—its image qual-



You really can't go wrong with a standard-definition tuner, as long as you purchase something that works with Media Center 2005.

ity is good and it's relatively inexpensive, so you can buy a pair. However, there are compelling tuners from ATI, nVidia, and other vendors as well. As for HDTV tuners, we recommend you don't invest in HD until CableCard readers become available in 2007.

REMOTE CONTROL

No self-respecting couch potato wants to walk across the room just to control the components in his A/V rack, and there are few things in life more aggravating than

trying to find the right remote among the menagerie that seemingly breed on your coffee table. That's where a programmable universal remote control enters the picture.

Ultra high-end remotes—think Crestron or AMX—enable you to manage not just your home-theater system, but everything from lighting, to motorized window coverings, to your HVAC system. Problem is, these devices cost thousands of dollars and require professional installation. Here's our alternative for ambitious do-it-yourselfers: Logitech's Harmony 890 and Z-Wave home-automation technology.

Z-Wave is a two-way, wireless (RF), mesh network protocol developed by Zensys, Inc. In a Z-Wave network, a remote control broadcasts commands to every device within range. Each receiving device interprets the command; acts on it, if it's the intended target (or ignores it if it's not); and relays the command to every other Z-Wave device within its range.

The Harmony 890 has a large library

of built-in device codes; and like many of its competitors, it can learn new commands and execute macros. What sets this device apart, in addition to its Z-Wave compatibility, is the way it's programmed. Forget about teaching it one instruction at a time; just plug the 890 into your PC's USB port and either download new codes from Logitech's website or program it from scratch using Logitech's software. With a Z-Wave module and this remote, you can control every aspect of your home theater, including the mood lighting.

The Harmony 890 is pricey at \$400, but its whiz-bang features—color LCD, easy programmability, rechargeable Li-Ion battery, RF-to-infrared blaster, and more—easily justify the cost.

Lest we forget that we're building a home-theater *computer*, you'll also need a good wireless keyboard and mouse. Microsoft's Wireless Laser Desktop 6000 is a solid candidate; Logitech's Cordless Desktop MX 3000 is another good choice.



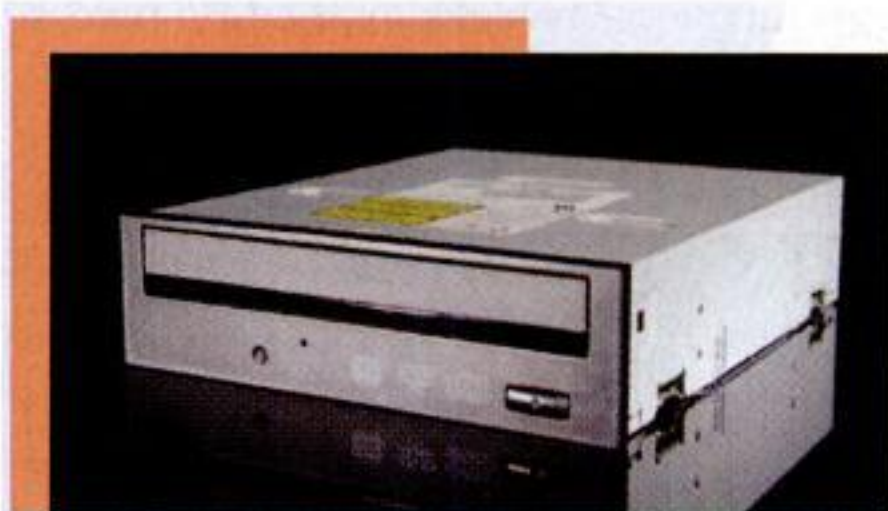
Push one button on the Harmony 890 (left) and you can turn on your TV, PC, and stereo, and start the movie. The Firefly (right) is the preferred remote for *Beyond TV*.

OPTICAL DRIVE

There hasn't been a whole lot of action in the optical drive arena over the last year—everyone has just been waiting on the next-generation formats. Now that Blu-ray and HD-DVD have finally arrived, folks who are assembling an HTPC have to make a choice: Do you want to go with DVD, HD-DVD, Blu-ray, or all of the above? If you've got a money hat, it can't hurt to cover all the bases, but most people will want to stick with DVD for now; the next-gen optical formats simply aren't ready for prime time.

Both Blu-ray and HD-DVD drives are ludicrously expensive, if you can even find them—the first Blu-ray drive to arrive in the Lab costs a whopping \$1,000 (see the review on page 82). Second, the DRM requirements are daunting and stupid (unencrypted digital signals won't work, but unencrypted analog signals work fine). The whole category is half-baked.

So that leaves us with DVD, and our favorite DVD writer is the workhorse Plextor PX716-A. We love this drive because we can get it to run silently by slowing it down with the included *Plextools* software. It also comes with a black bezel—a crucial feature for a slick-looking HTPC. Sure, there are newer models available, but frankly, their miniscule speed increases aren't worth the extra cash.



Plextor's PX716-A is still our favorite optical drive, despite the recent arrival of next-gen HD optical formats.

IR BLASTER

An infrared blaster is a crucial component in our home-theater PC configuration. These devices receive commands from your PC and/or your handheld remote control and pass them on to the appropriate device.

Some IR blasters are designed to work with specific universal remote controls. Universal Remote Controls' PowerBlaster for example, is an add-on product for that company's MasterControl line of universal remotes. And Logitech bundles an IR blaster with its Harmony 890 remote. Both these devices receive RF signals, convert them to infrared, and send them to hard-wired IR emitters that you glue in front of the receiving device's IR pickup.

Because they receive RF commands, there's no line-of-sight requirement for this type of IR blaster, which allows you to hide your components in a closet. The PowerBlaster hosts as many as six emitters; the Harmony 890 handles up to four.

Our system will also utilize a second type of IR blaster: Jon Rhees' clever USB-UIRT. This box will link our HTPC to either a cable or satellite TV receiver. It plugs into the PC's USB port, receives commands from both the TV tuner software running on the PC and from IR remotes, and passes them to the tuner. This will enable the software running on the PC to change the channels on the set-top box.



An IR blaster enables a home-theater PC to control a cable or satellite set-top box.

MOTHERBOARD AND CPU

The CPU for a home-theater PC must do two things well: encode video and run silently. That's where AMD's new Energy Efficient Small Formfactor Athlon 64 X2 3800+ comes into play. This new dual-core AM2 CPU delivers enough power to transcode video and watch TV at the same time, without your system being dragged to the floor like it would with a single-core CPU. The 2GHz, 512KB L2 chip has more than enough power.

To make the selection even easier, the EE SFF 3800+ is currently AMD's only dual-core with a "D" rating. A D means that even among its energy efficient brethren, the X2 3800+ is one cool cucumber. How cool? The Athlon 64 FX-62 is a 125 watt chip, the "Energy Efficient" X2 4600 is 65 watts. The SFF version of the X2 3800+ is a 35-watt jobbie. As Keanu would say, *Whoa*. We're not even sure we need a heatsink to cool this baby.

To go with our cool and quiet CPU, we picked up a kick-ass Asus M2N32-SLI motherboard (reviewed September 2005). The M2N32-SLI includes built-in 802.11g capability and a passive cooling design for the north bridge. It's SLI-ready for future expandability, so you can just drop in that second 7600 GT for more gaming power. The M2N32-SLI's heat pipes let you avoid the shrilling fans most mobos use to keep the chipset running cool, instead piping the heat into a heatsink near the CPU cooler, so it can handle the hard work.



The thermal equivalent of Uncle McScrooge, the Athlon 64 X2 3800+ and the heat-pipe M2N32-SLI make for a quiet yet powerful package.

HARD DRIVE

They say that size doesn't matter, but it's of primary importance when choosing a hard drive for a home theater PC. Movies, music, and adult entertainment take up a lot of space, so the more gigabytes you can muster, the better. And because the slim design of most HTPC cases limits you to just one or two drives, you'll want to maximize your storage capacity. Install one or two super-huge drives and you'll never have to crack open the case again (or at least not for a long, long time).

It's also important to consider the amount of noise and heat your drives will generate. Lucky for you, we haven't heard a "loud" drive in quite some time. All of the high-end 7,200rpm drives have moved to fluid bearings for the spindle motor, and are thus very quiet. Heat output, however, varies on a drive-by-drive basis. Western Digital drives typically run on the cool side, with Hitachi and Seagate a smidge hotter.

For our ultimate living room rig, we chose the 750GB Seagate Barracuda 7200.10 because it's freaking huge. It's so big that we could rip 180 DVDs to it, with room to spare for our music collection. That's a big honkin' drive.



Bigger is better when it comes to a home theater hard drive, and it doesn't get any bigger than Seagate's massive 750GB Barracuda.

VIDEOCARD

We strongly recommend choosing a videocard that's equipped with HDCP, even though we're not ready to endorse Blu-ray or HD-DVD. As much as we hate the DRM millstone that Hollywood insists on hanging on these next-gen devices, we don't want to be forced to replace an expensive videocard should we decide to upgrade later.

This limited us to two choices: We could have put any dual-GPU GeForce 7950 GX2 card in the case. They're surprisingly quiet and unquestionably powerful. Our other option was MSI's new GeForce 7600 GT. With a 580MHz core and 750MHz memory, the card is overclocked nearly as high as the fastest 7600 GT we've tested (XFX's 7600 GT XXX Edition).

We decided to go with the MSI card for three reasons: First, it's moderately quiet, thanks to a large, two-slot heatsink augmented by a small fan that forces air across it. Any 7950 GX2 we could have chosen would have two fans. Second, the 7600 GT draws power only from the PCI Express bus—it doesn't require any extra juice from the PSU. This not only enabled us to put a smaller power sup-

ply in the box, but it also reduced our overall ventilation requirements; an important consideration for a PC that needs to fit in an entertainment center. Our third motivator was budget: This 7600 GT is street-priced at \$180, compared to an average price of \$580 for a 7950 GX2.

The 7950 GX2 is obviously more powerful, so if you're a heavy gamer and this will be your *only* PC, you'll have different priorities. But since we wouldn't want to be mid-game when our HTPC's PVR functionality kicks in, the MSI card suits us fine.



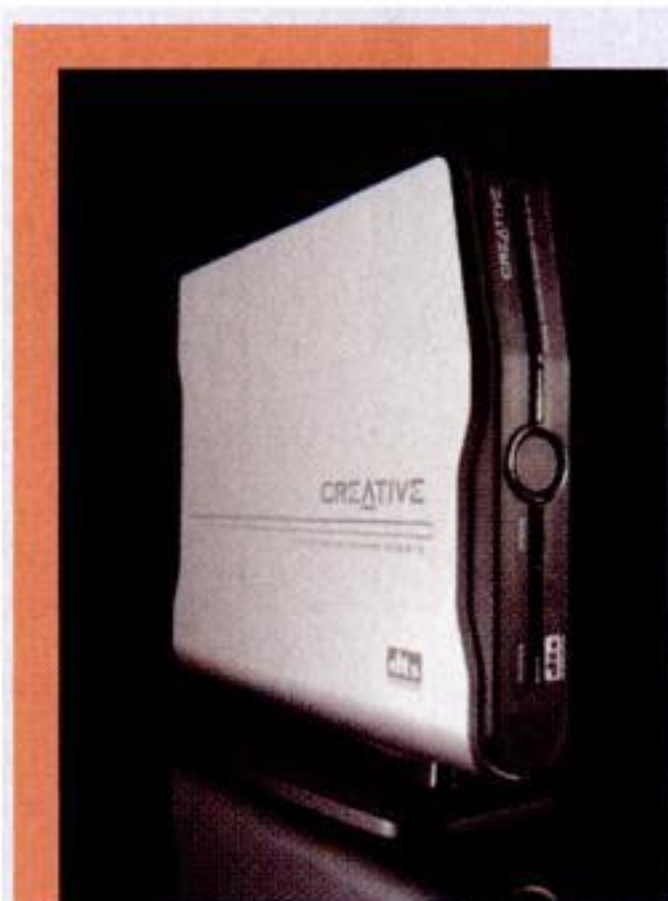
The videocard in your home-theater PC should have HDCP, even though we're giving both of the new high-def disc formats the bum's rush for now.

SOUND

Researchers have demonstrated that sound quality influences one's perception of visual quality. A great sound system makes a mediocre display look better, and a poor sound system makes a high-end display look worse. A great sound system is even more crucial when you want to take pleasure in music.

Onboard audio has come a long way, but we've yet to hear a sound chip on a motherboard that can compete with the sonic purity of Creative Labs' X-Fi. The primary culprit is noise: Listen closely to any onboard audio system and you'll hear the snap, crackle, and pop of interference from nearby components infiltrating the signal path. You'll never hear that with an X-Fi.

And there's nothing quite like playing a round of *Battlefield 2* with one of these puppies: The positional audio keeps you immersed in the game's universe. Because we're building a home-theater



Creative's Home Theater Connect DTS-610 can be an essential tool for integrating your PC into your surround-sound system.

PC, we'll want to plug it into a surround-sound A/V receiver with room-filling speakers (augmented by a powered subwoofer), as opposed to a self-amplified, near-field speaker system.

Audio connections between an X-Fi and an A/V receiver are problematic if your receiver lacks six discrete analog surround-sound inputs—the X-Fi won't pass 5.1 sound from games along a digital path. Although the X-Fi will pass digital audio from your movies across digital connections, it will down-convert all your 5.1 gaming to a two-channel stereo signal.

If you have analog inputs on your receiver, it's no problem. But if you don't, that's where Creative's \$100 Home Theater Connect DTS-610 comes in. This handy device takes in 5.1-channel analog surround sound, encodes it to DTS Interactive format your amplifier understands in real time, and outputs a digital signal via coaxial and optical SPDIF.

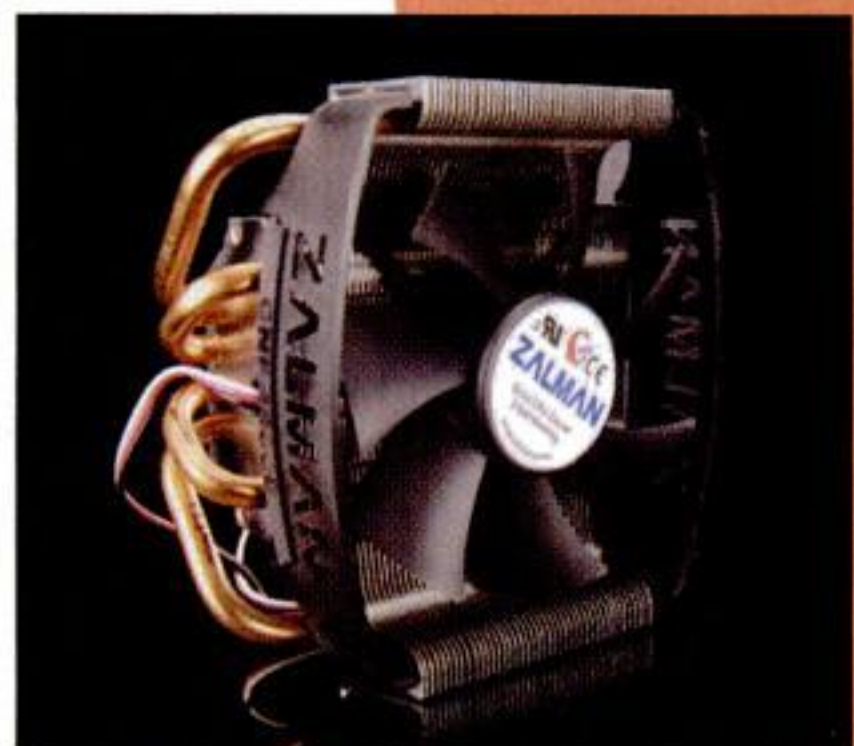
COOLING

Providing adequate cooling to a home theater PC is a unique challenge given the case's small size and the need for quiet operation. Typically, the only way to achieve nearly silent air cooling is to pair a super-sized cooler with a large, slow-spinning fan that moves plenty of air, but runs whisper-quiet. Unfortunately, it's not possible to install a gigantic cooler in an HTPC, due to obvious size constraints. Though a stock CPU cooler will fit just fine inside the case, most stock coolers are anything but quiet—although this applies more to Intel's Pentium 4 than it does to AMD's procs. In general we recommend low-profile coolers for HTPCs. There are several on the market, and they are designed with the size

constraints of an HTPC case in mind.

Water-cooling is a more expensive option, but it works very well in terms of both cooling performance and silence. The two kits we recommend for HTPC usage are the Zalman Reserator 1 Plus and the Thermaltake Symphony Mini. Both kits are dead silent and use large external reservoir/radiators to carry heat entirely out of your entertainment center.

For our HTPC, we chose an all-new, low-profile Zalman CNPS 8000. Unlike most low-profile coolers, this one actually performs quite well, and kept our X2 3800+ CPU chilly at all times. It's easy to install and kept temps in check without making any noise—that's just the way we like it.



Most low-profile coolers are so small they sacrifice performance for size, but Zalman's CNPS 8000 CPU cooler doesn't.

Cool Performance



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Here's the latest in Corsair's ten year heritage of innovation in performance memory: we've redefined memory heat sink technology. And the result is unprecedented performance and reliability. When we ran a preview module through system benchmarks at COMPUTEX, an overclocked DHX module with our optional airflow fan was able to hit a heart-stopping 1250MHz (PC-10,000) while maintaining cool, reliable performance.

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Pushing performance specs generates heat, and that can compromise reliability and component life. The advanced cooling ability of DHX heat sinks keeps your memory safe and reliable even as you push it to the limit. Under the name XMS2 Dominator, this DHX technology will be showing up on both Corsair parts designed for extreme overclocking and on memory designed for performance computing and gaming.

Also Featuring Enhanced Performance Profiles (EPP)

As with all new Corsair performance memory, XMS2 Dominator modules feature EPP, the new open standard for the Serial Presence Detect (SPD) jointly developed by NVIDIA and Corsair. EPP simplifies overclocking for beginners and provides unparalleled control for experts.



An optional fan (not shown) provides even more cooling and protection.



Corsair's proprietary DHX technology dissipates heat two ways: it draws heat away from the module through the RAMs and provides an additional path for heat transfer within the module through the ground plane!

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CASES

There are literally dozens of cases designed for home-theater rigs, but most aren't worthy, and many are a pain in the ass to work in. We built full systems in five of the best HTPC cases to find the ultimate home-theater chassis!

THERMALTAKE BACH WITH MEDIA LAB

Thermaltake's Bach case is similar to a standard desktop enclosure, and as such it's roomier than most HTPC cases we've tested. It's capable of swallowing a power-user config (and then some), including an ATX motherboard, up to five hard drives, three optical drives, and any standard-size power supply. This Media Lab version includes a remote control and an add-on VFD (vacuum fluorescent display). Although we encountered a few issues building a system in the case, the experience was positive overall, and the rig ran quiet.

Typically, one of the biggest problems with building inside an HTPC case is the limited clearance. Thermaltake sidesteps this tricky issue with removable support bars running across the top of the case. Remove the support bars, and you can drop everything directly into the interior—very handy. After you drop in the mobo, you slide in the optical, install the PSU, and attach it all. There are two hard drive cages, and both are removable, making the build even easier.

Still, we had a few problems with our build. The main drive cage, which holds three drives, extends out over the main power connector on our A8N32 mobo, blocking access to that part. Luckily, there's a second drive cage that hangs from the top of the chassis, near the bottom of the mobo. The supplemental cage holds two drives, so we used that instead. But there's another little problem: Because the secondary drive cage rests over the lower portion of the mobo, it won't work with a GeForce 7800 GTX videocard, although a 6800 GT fit just fine.

This version of the Bach comes with an add-on VFD and remote control. The screen installation could have been a little easier, but it wasn't particularly difficult. The remote's 10-foot interface is slick and easy to use, though many of its buttons are way too small.

AHANIX MCE701

If you're the conservative type who's looking for an enclosure that blends seamlessly with the other gear in your A/V rack, you can forget about the Ahanix MCE701. But if you're geek enough—and we certainly are—to revel in the double takes your friends and family will surely do when they see what's in there, boost your homeowners' insurance: This case could cause neck injuries.

The 7-inch LCD is the star of the show, and it's not just a pretty face; it's a fully functional, 1280x768 touch screen. Yep, you can control nearly every aspect of this machine with the tip of your finger. The MCE701 will accommodate either ATX or MicroATX motherboards within its all-aluminum chassis and bezel (the bottom is fabricated from steel), and it offers plenty of room for storage and amenities. The internal drive bay can handle up to four 3.5-inch drives, there's an external 5.25-inch optical-drive bay, and one 3.5-inch external media-reader bay. Rubber grommets at every drive-fastening point soak up any ambient noise and vibration, and a drop-down panel discretely hides both the media reader and the front-panel FireWire, microphone, headphone, and USB connections.

When we installed the 750GB Seagate Barracuda for the How-To portion of this story, however, we discovered that the power connector on the Asus M2N32-SLI motherboard we selected blocked one of those bays. That's not a major problem considering the capacity of today's drives, but we do wish the designers had thought to include space for a cooling fan here. While it's true that the removable bay's ribbed construction behaves like a heatsink, it's just not as effective.

Other than that, building our home-theater rig inside this case was a breeze. We found plenty of room to maneuver components into place, and the ATX power supply we chose slipped in like it was on greased rails. The only tight spot we encountered was securing the thumbscrews to the right side of our optical drive. When we slid the finished product inside our entertainment center, we had about three inches to spare all around.

If you're searching for an HTPC case with both flash and substance, take a long look at the Ahanix MCE701.

THERMALTAKE BACH

\$110 (\$100 extra for Media Lab), www.thermaltake.com

8



The Thermaltake Bach is available in both silver and black.

AHANIX MCE701

\$300, www.ahanix.com

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Available in silver or basic black, the Ahanix MCE701 strikes a pose infused with both elegance and power.



[Energy



Efficient]



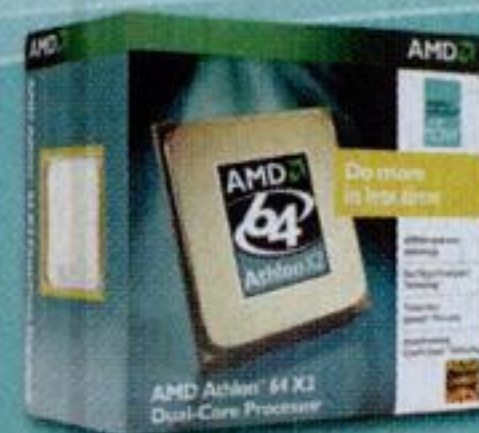
Athlon™64 X2 4800+* (Socket AM2)

- Part Number: 80728-9
- Code Name: Windsor
- Thermal Power: 65W
- L1 Cache: 128KB x 2
- L2 Cache: 1MB x 2



Athlon™64 X2 4600+* (Socket AM2)

- Part Number: 80727-9
- Code Name: Windsor
- Thermal Power: 65W
- L1 Cache: 128KB x 2
- L2 Cache: 512KB x 2



Athlon™64 X2 4400+* (Socket AM2)

- Part Number: 80726-9
- Code Name: Windsor
- Thermal Power: 65W
- L1 Cache: 128KB x 2
- L2 Cache: 1MB x 2



Athlon™64 X2 4200+* (Socket AM2)

- Part Number: 80725-9
- Code Name: Windsor
- Thermal Power: 65W
- L1 Cache: 128KB x 2
- L2 Cache: 512KB x 2

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Athlon™64 X2 4000+* (Socket AM2)

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- Code Name: Windsor
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- L1 Cache: 128KB x 2
- L2 Cache: 1MB x 2



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COOLER MASTER CM MEDIA 250

The CM Media takes a slightly different tack than other HTPC cases. It sports extraordinarily squat proportions, and only works with MicroATX mobos. But its inability to accept a massive hardware payload doesn't necessarily hurt it as an HTPC enclosure, because the parts requirements are more modest than with a Dream Machine type of config.

Once you plop down the mobo, you can add two optical drives, two hard drives, and a PSU of any size. We even had enough room to use a single-slot GeForce 7800 GTX videocard—something that wasn't possible with some of the other HTPC cases. The only rub is that this case's low profile makes the interior super-cramped, especially around the drives and the moth-

erboard, which almost overlap.

The case is blessedly quiet, even despite the case's teeny, tiny exhaust fans (small fans are usually the loudest). Though, with just these two fans, and no exhaust fan, there's almost no airflow inside the case. Like most MicroATX cases, the CM Media has only four expansion slots.

The front of the case has an empty window in the lower left-hand corner that's designed to hold the optional VFD, dubbed the Multimedia Value Package. Here's the problem: In order to install the display you have to dismantle the entire front bezel, which requires removing 12 small screws and disconnecting all the I/O ports. It's a stupid design; we would have much preferred to just pop off the bezel.

COOLER MASTER CM MEDIA

\$100 (\$70 for VFD),
www.coolermaster.com



The Cooler Master CM Media is surprisingly slim and MicroATX-only.

For simple configs, this case is acceptable. For anything else, and especially if you want a front-mounted display, it's not recommended.

ANTEC FUSION

HTPC cases are often designed to blend in with other home-theater gear, which Antec's Fusion illustrates perfectly. We love the look of the case, and the round volume knob really drives home the HTPC aesthetic. Looks aside, the Fusion is a very well-thought-out case that's quiet, and surprisingly cool.

It too is a MicroATX-only enclosure, and it's designed with distinct chambers for your various parts. The hard drives, power supply, and optical drive are separated by interior walls, which have holes through which to route the cables. The main section holds the mobo, and is cooled by not one but two Antec 12cm Tri-cool fans—our favorite 12cm fan because it's very cool and quiet. On the quiet tip, the hard drive cage (which holds two drives) uses thick silicone grommets

ANTEC FUSION

\$220, www.antec.com



We love the Antec Fusion's volume knob and stock vacuum fluorescent display.

to absorb drive noise, and they work wonderfully.

Not surprisingly, this case uses the exact same front-panel display as the other cases in this roundup. There's one big difference though—with this case the display is already installed, which is a godsend since this was a major nuisance with the other cases here. The round knob on the case's right side controls system volume.

Now for the gripes: Once you drop the mobo into the case, there are only a few millimeters of clearance between it and the perimeter, so plugging in front panel connections and IDE ports is very difficult. It's also unfortunate that the Fusion only works with Micro ATX, which severely limits your motherboard options.

SILVERSTONE LC18

Silverstone offers 25 different HTPC cases, so we asked for the very best. We received the LC18, and it's typical top-shelf Silverstone quality—refined, elegant, and very well-made. It's extremely pricey, however, which will scare people away.

Like all Silverstone cases, it's made from brushed aluminum and looks absolutely decadent. Once you remove the top cover, you'll see an expansive interior that's plenty roomy for a HTPC chassis. The case accepts an ATX mobo, two optical drives, and any-size PSU. It'll basically hold as much hardware as you can throw at it. It'll even hold up to five hard drives, although there are no included fans to cool them. There are mounts

below the cage for two 8cm fans.

Installation is pretty straightforward, but we experienced one small problem. You have to remove the hard drive cage from the interior, install drives in it, and then put the cage into the case. This is a deep case, and the screws holding down the hard drive cage are all the way at the bottom, so to reach them you need an extra-long screwdriver (which we didn't have handy). The optical cage is easy to remove, and holds two drives, plus a 3.5-inch device.

The front of the case houses a large, 7-inch touch-sensitive LCD similar to the Ahanix. It's particularly handy when you're having difficulty connecting your PC to your TV.

SILVERSTONE LC18

\$600, www.silverstonetek.com



Like the Ahanix case, Silverstone's LC18 chassis features a 7-inch touch screen.

Despite a few flaws, the LC18 is a righteous chassis—if you can stomach the price.

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- Canon U.S.A., one-year warranty



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5.0 MP Digital Camera

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- DIGIC II Image Processor
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GETTING THE RIGHT PVR SOFTWARE

The wrong software will render your home-theater PC useless; to find out what's best, we tested the three leading contenders for HTPC software.

MYTHTV

The open-source community has created dozens of great products, including *Firefox*, *OpenOffice*, *Apache*, and the many flavors of Linux. *MythTV* could be in that category but for one thing—it's insanely difficult to configure.

After almost a full day of installing, tweaking, and patching, we finally got *MythTV* working on our Ubuntu 6.06 test rig, but without tuner support. We dug up some more documentation, and set to work getting the IVTV drivers in order, so that *Myth* could actually record a signal. Surprisingly getting the IVTV drivers working was more difficult than the software installation, and it took another full day to get the system running.

Once everything's working, and you've configured the TV schedule downloading process and rebooted the machine to get the tuner card drivers going, *Myth* is a fairly standard PVR, with a tasty 10-foot interface. To keep things simple, we used a keyboard to test the interface, and recorded a few episodes of the *Simpsons*. Image quality was comparable to similar Windows software.

We like *MythTV* because it records to an open format, lets you archive your shows to DVD, and includes all the functionality that the networks don't want end users to have on their PVRs. You can even install plugins that allow *MythTV* to access your music and photo libraries. We weren't able to get our *Myth* box to communicate with our satellite box, but we're relatively certain that that was a problem with our test rig, and that the functionality is offered by *Myth*—somewhere. A Google search of the proper sequence of keywords could likely find the document—buried on some guy's blog—that explains how to set it up.

When someone builds a bootable CD that contains an easy-to-maintain version of Linux—Ubuntu, Mepis, or the like—the IVTV drivers for Hauppauge cards, and *MythTV* preconfigured,

it stands a good chance of becoming a popular choice for PVR software. But we've spent a lot of time running Linux over the last two years, and *Myth* is just too damn hard to configure for us to recommend it.

main

Watch TV

Media Library

Manage Recordings

Information Center

Optical Disks

Utilities / Setup



Linux experts only! *MythTV* is powerful PVR software, but it's extremely difficult to set up and configure—especially if you're not versed in Linux.

WINDOWS XP MEDIA CENTER EDITION 2005

The Media Center version of Windows XP has come a long way in the last three years, but it's still got a ways to go. It handles the basics with aplomb—scheduling recordings, viewing live TV, and even accessing your music and photo collections within the couch-friendly 10-foot interface. Unfortunately, most of the problems with MCE2005 have more to do with Microsoft caving to the content providers than with problems with the software.

MCE2005 includes one of the slickest 10-foot interfaces we've tested. It's fast, responsive, and gives you access to every bit of content on your hard drive—if you store your content in the proper folders. In addition to your TV content, you'll be able to browse your music, photos, and even connect to your buddy list using Windows Messenger. It's also easy to use your Media Center rig as a server, streaming your recorded content to Media Center Extenders and Xbox 360s throughout your home.

The actual PVR functionality is greatly improved as well, with support for up to four TV tuners—two standard definition and two high-def.

You can even download DRM-encumbered music and movies from Microsoft's partner sites. It's highly convenient, but we're not fans of the DRM schemes Microsoft is using.

Draconian content-protection methods range from the famed “MCE automatically deletes *Sopranos* episodes after two weeks” problem to the lack of the automatic commercial skip. And the software occasionally forgot our tuner configuration for no apparent reason, which forced us to go back through the configuration process.

Further compounding the problems is the fact that MCE2005 is only available in an OEM package, and you can only buy the OS when you purchase other hardware. As the more expensive Vista SKUs will include Media Center functionality out of the box, this won't be a problem for long, however.

Even if MCE2005 were more readily available, it's tough to recommend the OS when Microsoft seems willing to please content producers at the expense of consumers.



Media Center 2005's fancy 10-foot interface is beautiful and easy to navigate, but the Microsoft solution favors content providers over end users.

BEYOND TV 4.3

Snapstream's *Beyond TV* is the closest thing to a Tivo we've tested. Unlike Media Center 2005, it's designed with one set of goals in mind—yours. Instead of kowtowing to the interests of Hollywood content providers in the hope of forming “partnerships,” Snapstream has actually built a piece of software with your best interests in mind. And unlike *MythTV*, *Beyond TV* is easy to install and configure on any Windows machine.

In addition to all the basic PVR functionality, *Beyond TV* adds a ton of power-user features to your HTPC. You can configure the software to automatically recompress your recorded TV shows using a more efficient codec during downtime, expunge the commercial breaks from your recordings, and log in remotely to change your recording schedule. It will even place pre-transcoded videos suitable for playback on portable devices in the appropriate folders, so they'll be copied automatically the next time you sync the device.

Let's talk a bit more about the different codecs supported. By default, everything gets recorded using MPEG-2. This format might not be optimal for space or quality concerns, but MPEG-2 does let you fast-forward, rewind, and pause live TV—you can't do that if you use Divx or WMV. Once the show is on your hard drive, however, you can configure *Beyond TV* to recompress it using either Divx or WMV to save disc space—perfect for those archival recordings. Best of all, because *Beyond TV* uses unencrypted, un-DRM'd formats, you can archive anything you record to DVD, whether The Man wants you

to or not! Furthermore, any videos that you toss into the directories that *Beyond TV* monitors will be viewable from within the 10-foot interface. We like that a lot!

Beyond TV supports over-the-air standard- and high-definition TV; by using IR blasters to control them, you can even connect a *Beyond TV* rig to your cable box or satellite tuner to record premium content.

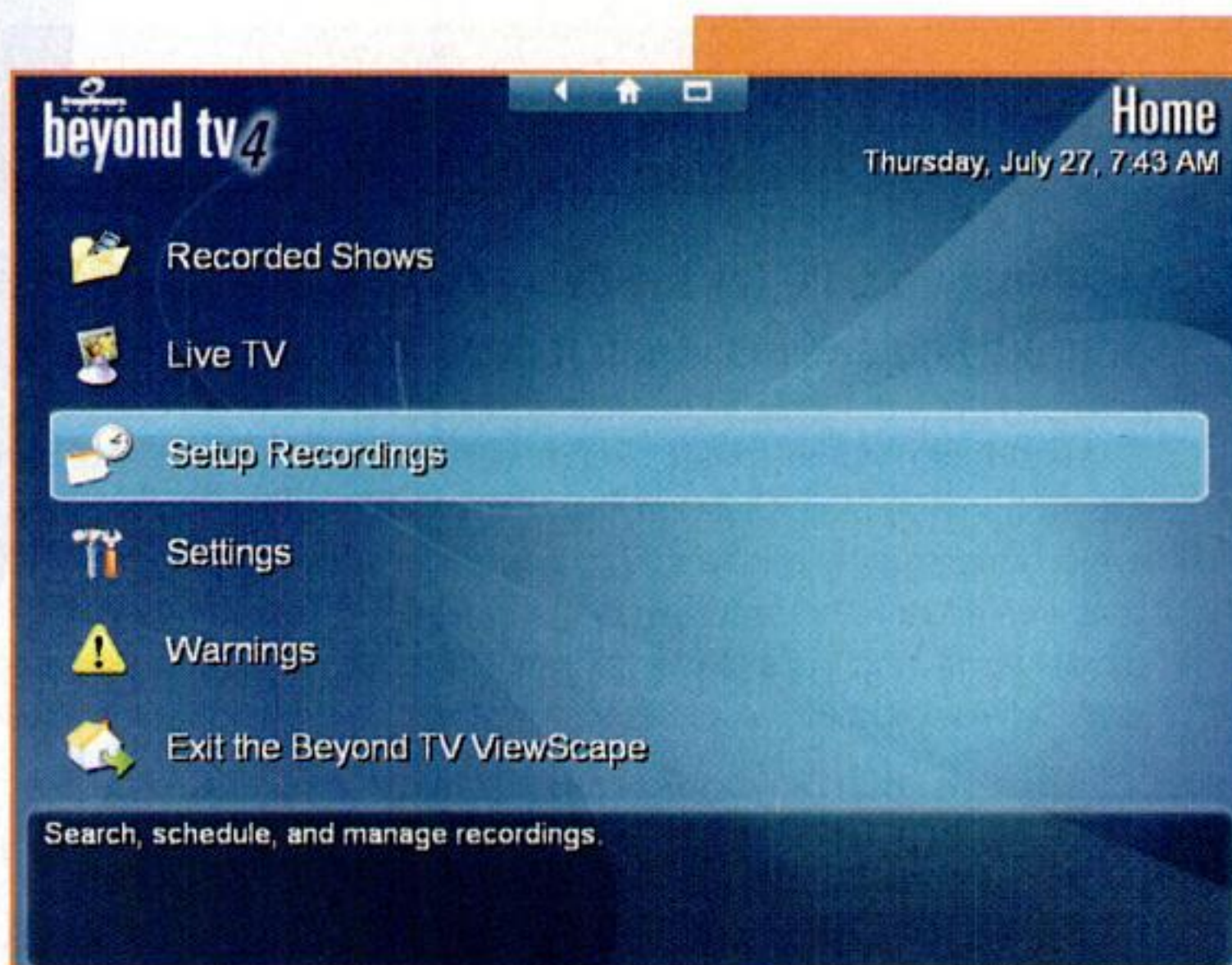
The bad news is that recording HD content from cable or satellite remains impossible for the time being. The good news is that you can add as many tuners as you'd like—people have built systems with as many as 10 tuners.

In addition to the remote-friendly 10-foot interface, there are several other ways to access your content. You can simply browse to the appropriate folder using Windows Explorer; then view content using your favorite video player. Or you can access the *Beyond TV* web interface from any computer on your LAN. You can also view live TV using the web interface. If you want to get a little fancier, the client-only version of the *Beyond TV* package is called *Beyond TV Link*. *Link* gives you access to the 10-foot interface over the network, even

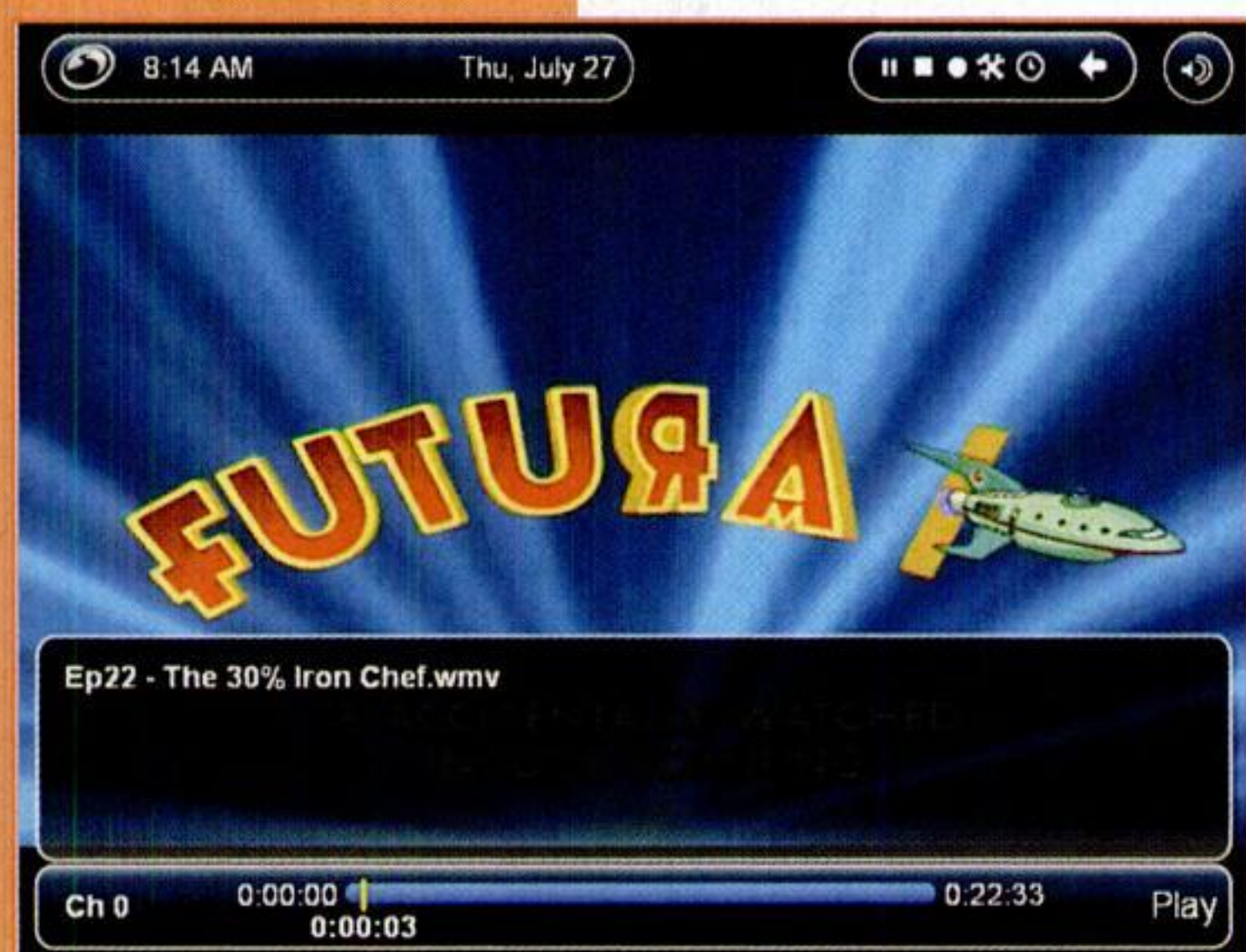
on machines that don't include a TV tuner. Essentially, it lets you turn any PC into a streaming box.

The final piece of the puzzle is *Beyond TV Media*. *Media* lets you access your music collection and photo album from within *Beyond TV*'s 10-foot interface. Currently, *Media* (and *Link*, for that matter) are stand-alone products. We like the a la carte approach that Snapstream has taken with its product. Instead of paying a ton of money for functionality you don't need, you can simply buy what you do need.

The bottom line is that *Beyond TV* is, hands down, the best PVR software we've tested for the PC.



The basic *Beyond TV* interface is similar to other PVR packages, but there's a lot more going on under the hood.



TV and video playback look great. The player will even use your 3D accelerator to apply transparent overlays to the video window.



Beyond Media lets you browse your music and movie collection from your couch.

How to Build a Home Theater PC

Assembling a PC for the living room is a little different than bolting together a power rig for gaming. Your key objectives: Keep it cool, and keep it quiet.

Evaluating the home-theater PC market based on what major system manufacturers are producing would lead you to conclude that it's kaput: HP currently has just one model remaining in its "Entertainment" line, and Dell has nothing at all in this formfactor.

But if the market's dead, why does Silverstone alone offer nearly two-dozen HTPC cases? No, the demand for these machines is strong—it's just that mainstream manufacturers don't seem to understand how to build them. But we do; and so

will you, soon enough!

For the most part, building a home-theater rig is just like building any other rig, with a few small differences. Never built a PC? You'll find a complete refresher course at www.maximumpc.com.

THE HARDWARE

CASE Ahanix MCE701
\$350, www.ahanix.com

MOTHERBOARD Asus
M2N32-SLI Deluxe
\$250, www.asus.com

CPU Athlon 64 X2 3800+
(Energy Efficient Small
Formfactor)
\$365, www.amd.com

VIDEOCARD MSI GeForce
7600 GT w/HDCP
\$180, www.msicomputer.com

TV TUNER CARD
Hauppauge PVR-250
\$150, www.hauppauge.com

SOUNDCARD Sound Blaster
X-Fi Extreme Music
\$120, www.creative.com

HARD DRIVE Seagate
Barracuda 7200.10 750GB
\$500, www.seagate.com

OPTICAL DRIVE
Plextor PX-716A
\$140, www.plextor.com

KEYBOARD & MOUSE
Logitech Cordless
Desktop S510
\$70, www.logitech.com

REMOTE CONTROL
Logitech Harmony 890
\$400, www.logitech.com

IR BLASTER USB-UIRT
\$50, www.usbuirt.com

MEMORY 2GB Crucial
Ballistix DDR2
\$400, www.crucial.com

CPU COOLER Zalman
CNPS8000
\$55, www.zalmanusa.com

POWER SUPPLY Antec
NeoHe 550
\$130, www.antec.com

THE SOFTWARE

OS Windows XP
\$200, www.microsoft.com

PVR BeyondTV
\$70, www.snapstream.com

1 INSTALL THE INTERNAL COMPONENTS

Make sure you have a long Philips screwdriver on hand. Temporarily remove the rear case fans and the hard-drive cage from the Ahanix MCE701 case, and then carefully angle the Asus M2N32-SLI motherboard down onto the case's stand-offs. Fasten it securely.

Next, install the CPU and heatsink. The Zalman model we chose blocked the first memory slot, so we installed our RAM into slots two and four. Mount the power supply next, and plug its power cables into the motherboard and the case's front panel. Reinstall the case fans and plug them in. Mount your hard drive into the cage (choose a bay that won't block your videocard or the motherboard's power socket), secure it to the case, and plug in its power and SATA cables.

Remove your DVD drive's faceplate and attach the aluminum one that Ahanix provides. Slide the drive into its bay, secure it using the provided thumbscrews, and plug in its power and ribbon cables. Install your videocard, but hold off on the soundcard and TV tuner until after you've installed Windows.



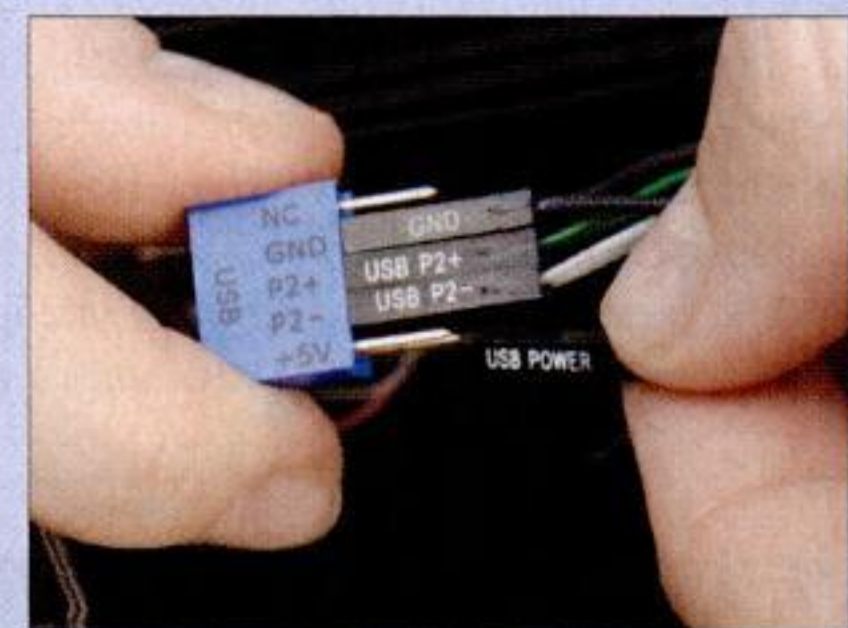
Tight space inside the case dictates using oversized thumbscrews to secure the optical drive in its bay.

2 CONNECT THE FRONT-PANEL DISPLAY

The Ahanix MCE701 is outfitted with a slick 7-inch touch-screen LCD (1280x768 resolution), which plugs into one set of your motherboard's internal USB ports. The Asus motherboard we used comes with three super-handly blocks—called Q-Connectors—that make it a cinch to plug in the case's front-panel connectors (LEDs, USB, and FireWire).

Unfortunately, you'll have to connect the touch screen the old-fashioned way. But as long as you orient these wires in the same way as you have the standard USB ports (note: the unmarked cable is a second ground), you shouldn't have a problem.

A thick cable extends from the front-panel display to the back of the case, where it terminates with a standard VGA connector. After you've installed your videocard, you'll plug this cable into one of its outputs (you'll need the DVI-to-VGA adapter that came with your videocard). Don't forget to install the screen's device drivers after you've installed Windows.

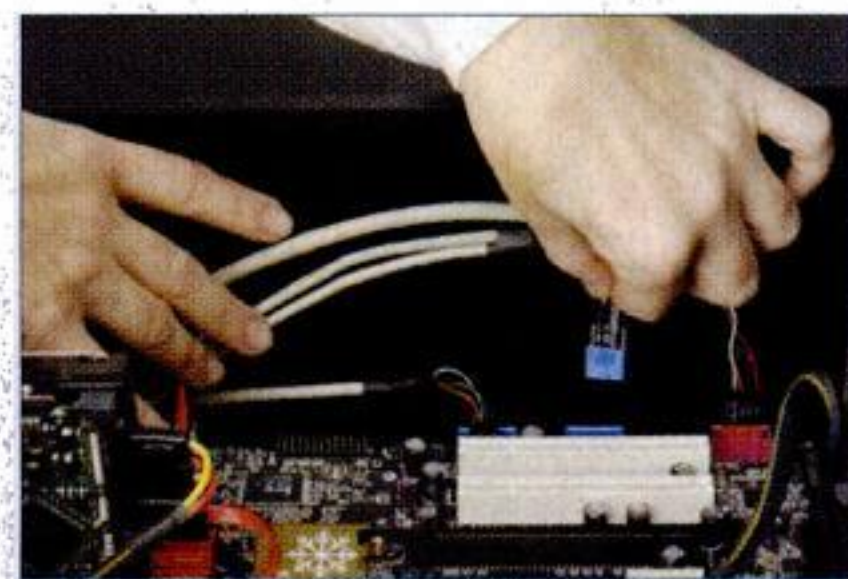


The front-panel touch-screen display plugs into your motherboard's USB port.

3 MAXIMIZE YOUR AIRFLOW

Home-theater PCs are designed to fit inside a rack with other electronics gear, which means their dimensions are narrower and shallower than many other PCs; as a result, their internal components wind up in close proximity to one another. We want this machine to be ultra quiet, however, so install as few case fans as you think you can—one blowing air over the hard drive, and another exhausting air from the back of the case should do it.

Finally, an HTPC will likely spend most of its useful life buttoned up tighter than Queen Victoria's corset, so it's critical that the internal wiring is arranged with an eye toward maximizing airflow channels. Wherever possible, route cables around the perimeter of the case, so that air moves unimpeded from the front to the back. Zip-tying cables together will make this task easier, and it will reduce the amount of space the cables consume overall. Good cable management will also make your DIY job look more professional—which is gratifying even if you're the only person who ever sees it.

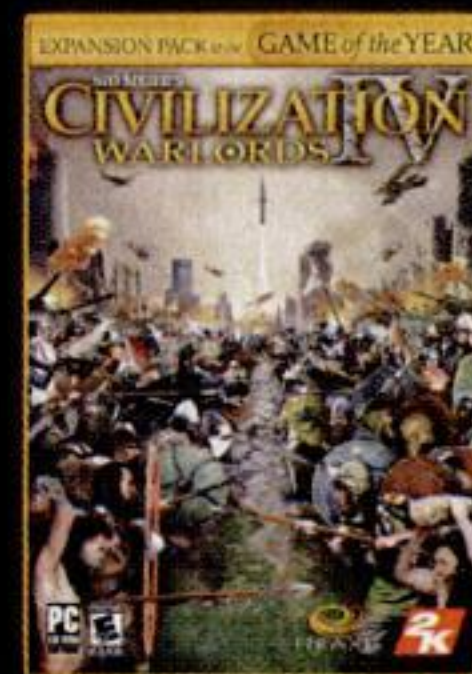


Wherever possible, route your cables around the periphery of the case. This will maximize airflow and keep temperatures inside the case manageable.

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4 INSTALL THE SOFTWARE INFRASTRUCTURE

Now that your HTPC is assembled, it's time to perform the basic steps to get it ready for prime-time viewing (or listening, or recording, or whatever else you expect to do with your home-theater PC).

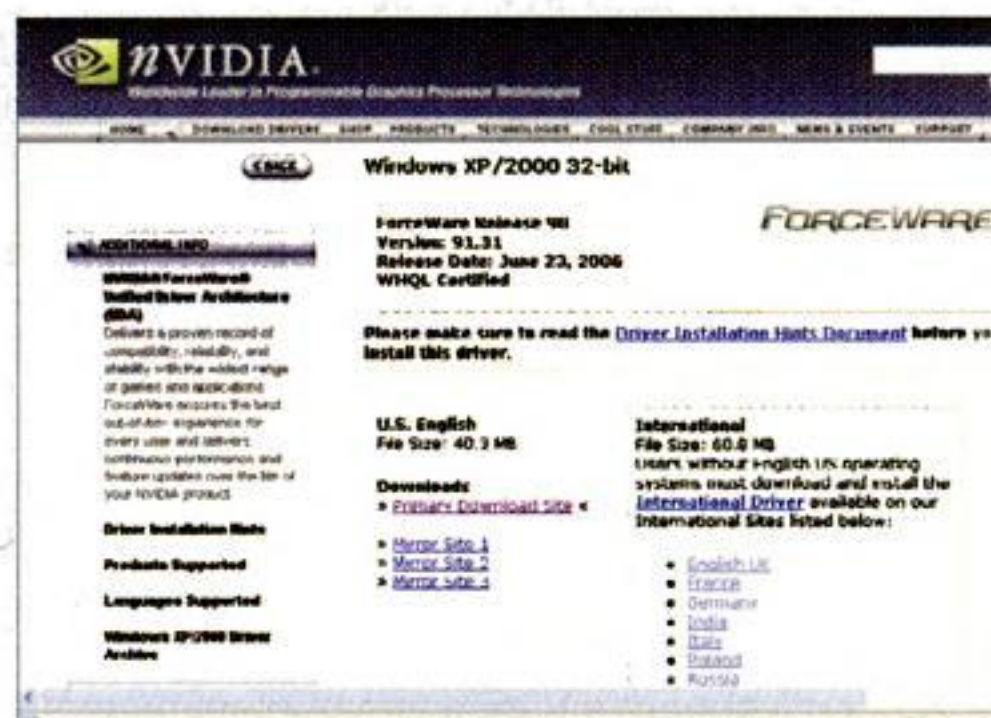
Because you'll be using the machine as a digital video recorder for time-shift viewing and archiving your favorite TV shows and movies, you'll want to divide its hard drive into two partitions to keep the constant recording and deleting of the PVR content from fragmenting the contents of your hard drive. You'll set up your partitions during the Windows XP install.

Set your BIOS to boot from CD-ROM, drop your Windows installation disc in the drive, and restart the system. When prompted, press any key on your keyboard. If you need to configure a SCSI drive or a RAID array, you'll need to press F6 and install the required drivers from a floppy disk when prompted by the Windows installer; otherwise, wait until the partitioning screen appears.

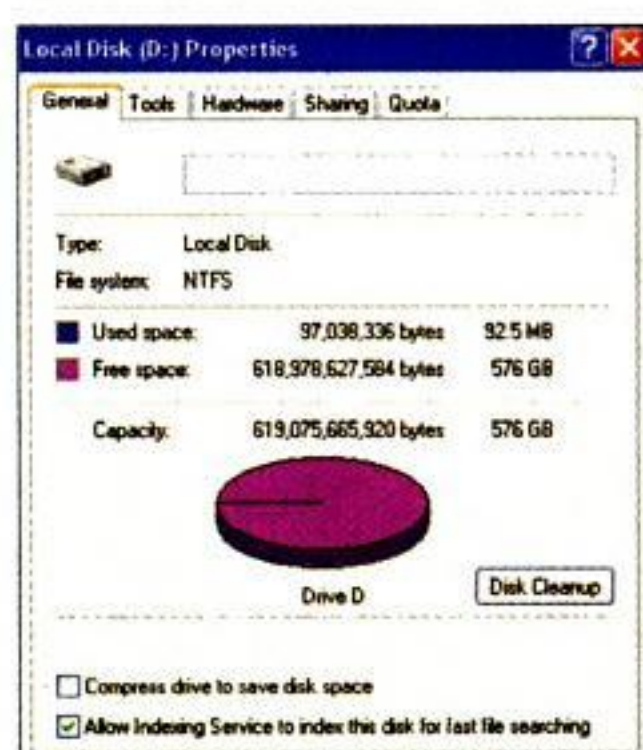
The first step in your OS installation will be to partition and format your hard drive. Create a C: partition using at least 75GB of your drive's capacity for Windows and your application software (we set aside 125GB of the 750GB available on our Seagate Barracuda). Create a D: partition using the balance of the available space for data storage; alternatively, you could create two or more additional partitions and reserve one specifically for video recording and the others for digital photos, music, and the like). Doing so simplifies the process of creating backups or drive images, but it isn't strictly necessary.

Once your drive is properly partitioned and the C: drive formatted, proceed with your normal Windows installation. When that's finished, install the chipset drivers from the disc that came with your motherboard. The next step is to obtain and install the most current drivers for your videocard. Take it easy on your eyes and set your videocard to match the native resolution of your display, even if you're only using that display temporarily; just don't forget to reset it to match whatever display device you'll ultimately use—e.g., your TV.

Download and install the most recent Windows updates from Microsoft's website, and then obtain and install the most recent BIOS and chipset drivers for your motherboard, as well as the latest drivers and utility software for your soundcard and TV tuner (you'll install these later, of course).



Once you have a working Ethernet connection, download and install the latest video drivers from your mobo manufacturer's website.



We recommend dividing the drive so that the PVR software records video to a partition separate from the one that Windows is installed on.

Now that your machine is up and running with its basic infrastructure, you can install the rest of the hardware: Shut down the machine, plug the soundcard into an available PCI slot, restart it, and install its device driver and any associated software. Repeat this process for the TV tuner.

5 DO THE POST-ASSEMBLE BOOGIE

The first thing you need to know about installing *Beyond TV* is that if you intend to use a remote control with the program, you must install the drivers for the remote before you install *Beyond TV*. You should have already installed any TV tuner cards that you'll use with the program. Finally, ensure that your PC has an Internet connection.

We'll use Snapstream's own Firefly remote to control *Beyond TV*, and Logitech's Harmony remote to control other aspects of our home-theater system, particularly the A/V receiver. Both remotes can send commands using a radio frequency, which means they don't depend on line-of-sight to operate.

Install the Firefly's software first, and plug its RF receiver into one of the PC's USB ports when prompted. Once you've installed the remote drivers, you can move on to installing the main program. The first step in the *Beyond TV* installation routine is to designate which remote control you'll use with the program (you could use a keyboard and mouse, but we prefer to use the remote from the couch). If you've installed the Firefly remote, make sure you choose it and not the Firefly Mini.

The software will auto-detect any supported TV-tuner/video-capture card(s) installed in your PC, but you'll need to designate the broadcast video source (choosing between analog or digital antenna, straight-from-the-wall cable, or cable or satellite TV set-top box) for each of them.

The next step is to download a programming lineup, which is based on your zip code, your service provider, and the level of service you subscribe to (i.e., basic, extended basic, or premium). We'll show you how to download the guide in the section on configuring *Beyond TV*. Now you'll need to tell the software which of the tuner card's video inputs you'll use to receive programming. As for audio inputs, most cards have just one, the line-in stereo port.

If you're connecting a set-top cable or satellite decoder, you should use the tuner card's S-Video input. You'll also need to configure the software to communicate with the box, so that it will be able to change channels using the IR Blaster. *Beyond TV* ships with configurations for a fair number of set-top boxes, but don't fret if yours isn't listed; It's not at all difficult to set up a custom configuration. If you're using the USB-UIRT IR blaster, you'll simply point the set-top box's remote at the USB-UIRT, then press the appropriate buttons when the install routine prompts you. When that's done, you can test the IR blaster to make sure it's properly aimed and that it sends the correct commands to the set-top box.



It's important that you install the drivers for the remote control you intend to use with *Beyond TV* before you install *Beyond TV* itself.



You'll know you've successfully installed *Beyond TV* when you see and hear video streaming through your TV tuner.



ideazon.com/merc



6 CONFIGURE BEYOND TV

You won't realize how powerful *Beyond TV* is until you configure it to suit your entertainment needs. After you've spent a few minutes in this section, you'll understand why we've recommended this software even though just about every TV tuner on the market ships with PVR software of its own.

The majority of *Beyond TV*'s settings deal with the infrastructure of your PVR system and are accessed by right-clicking the *Beyond TV* icon in the taskbar and choosing Advanced Settings from the pop-up menu. This opens a configuration menu in your web browser, which has two options: Basic Settings and Advanced Settings. (Don't worry, the confusion spawned by clicking Advanced Settings in order to access Basic Settings doesn't last long.)

You'll find that you've already made many of these decisions during the installation routine—the directory where you'll store recorded TV shows, for instance—and the default values for most parameters will work. However, the software gives you immense flexibility to tweak its behavior, which makes our PC-based PVR superior to any stand-alone device that performs the same function.

The only Basic settings you'll likely want to fool with are Snapstream.net Settings and ShowSqueeze. Snapstream has big expansion plans for its online service; but for now, it enables you to schedule TV recordings over the Internet or with your cellphone, browse TV listings online, and receive email alerts about your favorite shows. If you didn't sign up for a Snapstream.net account during installation,

you can sign up for it here. If you did, one of the most important settings here is the priority assigned to remote recordings. The remote-recording commands you schedule over the Internet are prioritized differently than the recordings you manually set up, and could preempt another, more important recording. If you assign a low priority to the shows scheduled via remote recording, they'll never overwrite anything (but the trade-off is that they might not be recorded in the first place).

ShowSqueeze will automatically compress recordings to conserve storage space. *Beyond TV* turns off this feature by default; if you turn it on, you can control whether it converts MPEG-2 files to either Windows Media or Divx format after the recording is done. You can also configure the app to automatically delete the source file after it's converted.

DRILLING A LITTLE DEEPER

The Advanced settings are much more interesting. On the Video Qualities screen you can tweak the values (including audio and video bit rate and dimensions) for almost 40 MPEG-2, Windows Media, and Divx configurations. You can even create entirely new profiles. If you're interested in streaming video over your own network or over the Internet, Streamer Server Settings enables you to modify the default values of *Beyond TV*'s built-in streaming server.

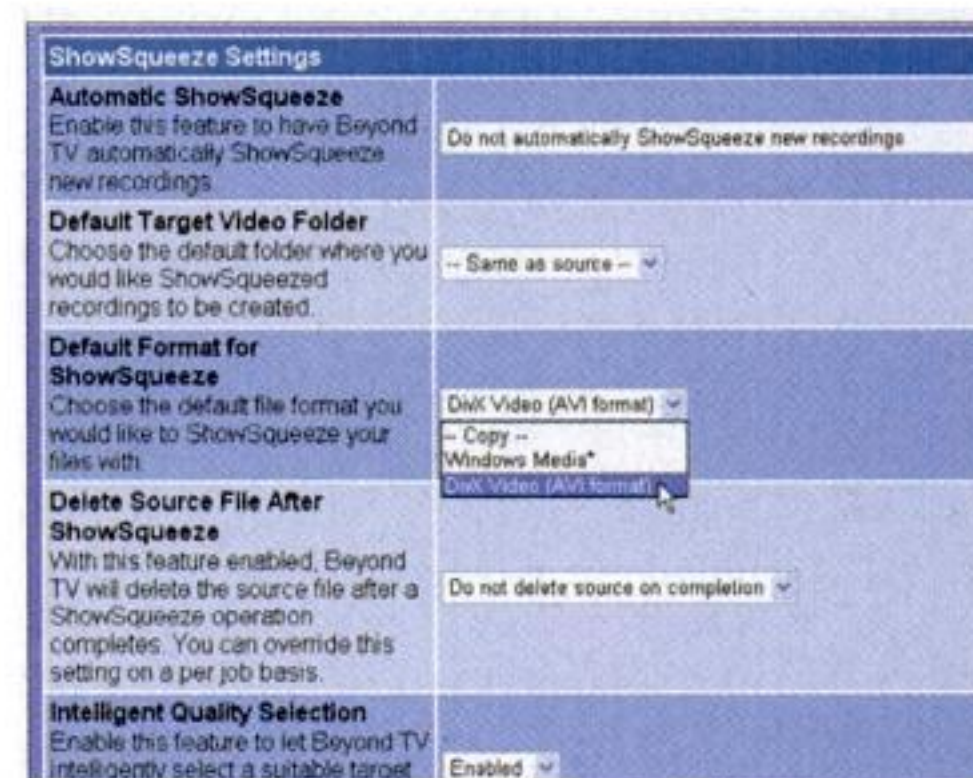
Yet another Settings menu is contained within *Beyond TV*'s 10-foot interface (known as ViewScape), and it's largely a subset of the other two. To get there, launch the program and click the Settings menu. This will take you to a screen with five submenus: Recording, Playback, ShowSqueeze and SmartSkip, SnapStream.Net, and General.

In Recording Settings, you can choose the recording format (MPEG-2 is the default), recording quality (including two grades of "DVD-ready"), and the number of minutes of padding (additional minutes before and after a scheduled recording) that will be recorded in case a program starts or ends before or after its published schedule. We recommend you record using the MPEG-2 format, as that's the only way you can pause, rewind, and fast-forward live TV.

If you have a DirectX 9 video-card, we recommend you configure



You'll find a raft of power settings in *Beyond TV*'s Web Admin configuration tool.



Turn on *Beyond TV*'s ShowSqueeze feature and it will automatically convert shows recorded in MPEG-2 to Windows Media or Divx formats, both of which sport higher compression ratios.

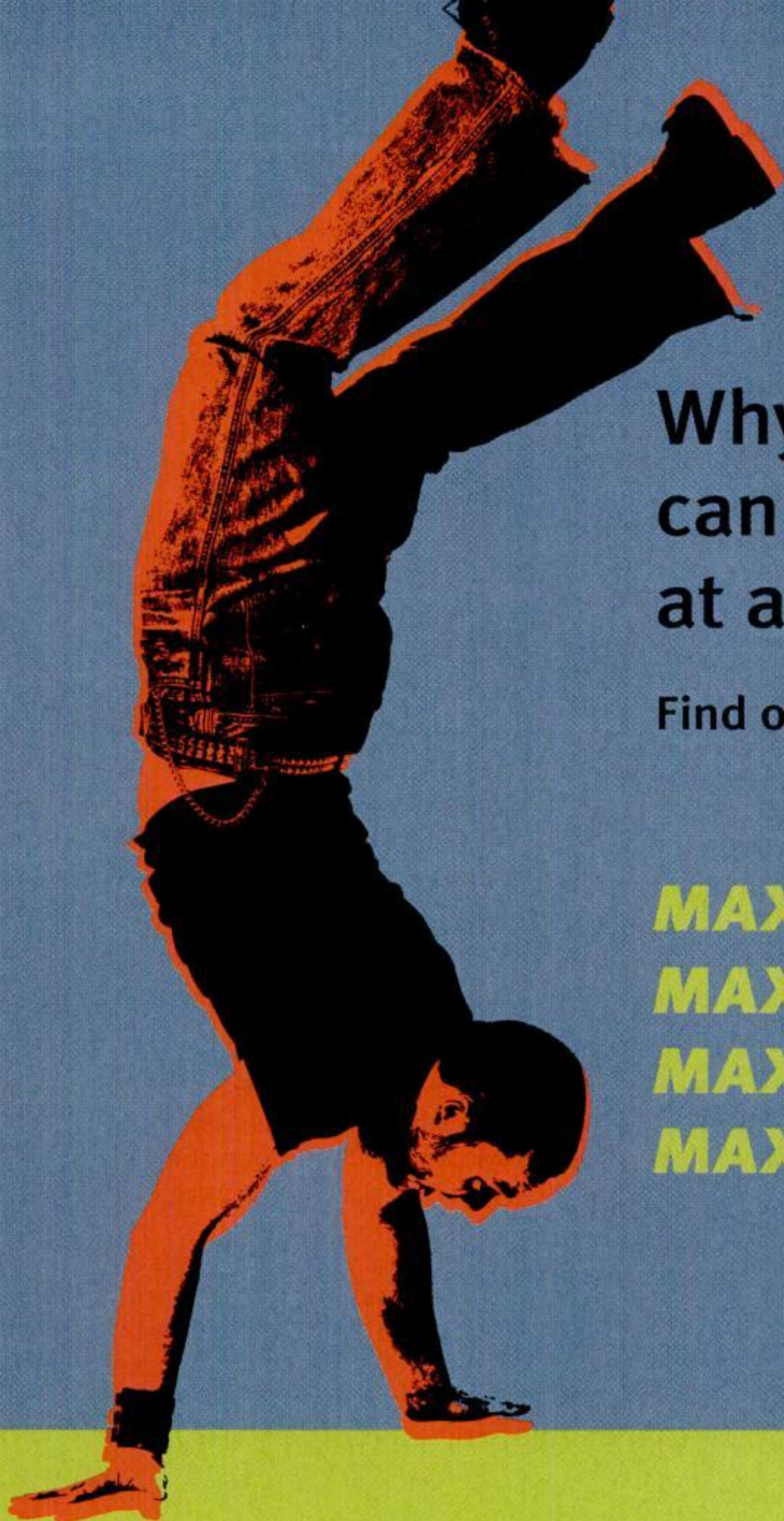
Playback Settings to use the 3D-accelerated video renderer. Then *Beyond TV* will superimpose transparent dialog boxes over the video instead of the default overlay, which obscures the underlying video. You should also enable hardware deinterlacing for best picture quality. If you're watching TV on a widescreen display and the video looks either stretched or compressed, enable non-square pixel compensation.

For the ShowSqueeze and SmartSkip settings, we recommend you leave Automatic ShowSqueeze and its related features at their default values (unless you have very limited hard-drive capacity). Enabling SmartSkip will make it easier to skip multiple commercials with a single click; but SmartSkip only runs after the recording is complete. If your HTPC will be running 24/7, choose the "generate during off peak times" option, so it won't interfere with other uses you might have for the machine.

We've really only scratched the surface of *Beyond TV*'s customizability here. We encourage you to explore all three settings menus after you've mastered the more common aspects of the program.

Bitrate	Windows Media Qualities	Edit	Delete
20 kbps	28.8 Modem	Edit	Delete
30 kbps	PocketPC - IPAQ Standard	Edit	Delete
40 kbps	56K Modem	Edit	Delete
60 kbps	Single Channel ISDN	Edit	Delete
104 kbps	PocketPC - Casio E500	Edit	Delete
112 kbps	Dual Channel ISDN	Edit	Delete
124 kbps	PocketPC - Jornada	Edit	Delete
176 kbps	Cable/DSL Low	Edit	Delete
212 kbps	PocketPC - IPAQ High	Edit	Delete
253 kbps	Windows Smartphone	Edit	Delete
400 kbps	Cable/DSL Medium	Edit	Delete
672 kbps	Creative Zen Vision	Edit	Delete
684 kbps	Near VHS (Windows Media Recording Default)(Windows Media Live Streaming Default)(Windows Media ShowSqueeze Default)	Edit	Delete
714 kbps	Fair	Edit	Delete
800 kbps	Portable Media Center	Edit	Delete
1200 kbps	VHS	Edit	Delete
1364 kbps	Good	Edit	Delete
1764 kbps	Better	Edit	Delete
2264 kbps	Near DVD	Edit	Delete
2428 kbps	Best	Edit	Delete
5128 kbps	WMV9 HD (Low)	Edit	Delete
6256 kbps	WMV9 HD (Medium)	Edit	Delete
7384 kbps	WMV9 HD (High)	Edit	Delete

Navigate to *Beyond TV*'s Video Qualities screen, and you'll be able to tweak almost every aspect of 40 different video-recording formats.



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WHAT ABOUT HIGH-DEFINITION TV?

High-definition television is becoming increasingly popular as the prices for HDTV sets and services (cable and satellite) fall. Unfortunately, the only way to get HDTV programming into your home-theater PC is with an antenna that can pull broadcast HDTV from the airways.

And there's plenty of such free content to be had—provided you live reasonably close to where it's originating. If you live in a rural area or even in a far-flung suburb, you're probably out of luck. If you need digital cable or satellite TV service to receive HDTV, you'll be stuck with the lower-resolution content that emerges from your set-top box's S-Video output.

It's not that there are no HDTV tuners for the PC—there are plenty, including ATI's brand-new TV Wonder 650—the problem is that these tuners have neither analog (component) nor digital (DVI or HDMI) inputs, so you can't feed them high-def content from your set-top box. The root of the problem stems from Hollywood: The bigwigs running the TV and movie studios won't allow the cable and satellite companies to make such connections possible.

Microsoft and ATI recently managed to make some headway on this front, with the announcement of OCUR (pronounced “oker,” the acronym stands for Open Cable Unidirectional Receiver). This device will finally enable digital connections between standard- and high-definition digital-cable set-top boxes and PCs, but there's a huge catch: OCUR can be implemented only in new complete OEM systems. Not only can you not install it yourself, but you can't even buy the component unless it's included in a new PC. According to Microsoft and ATI, Hollywood agreed to OCUR only because Microsoft promised that its DRM software is unbreakable. (Yeah, we're laughing right along with you.)

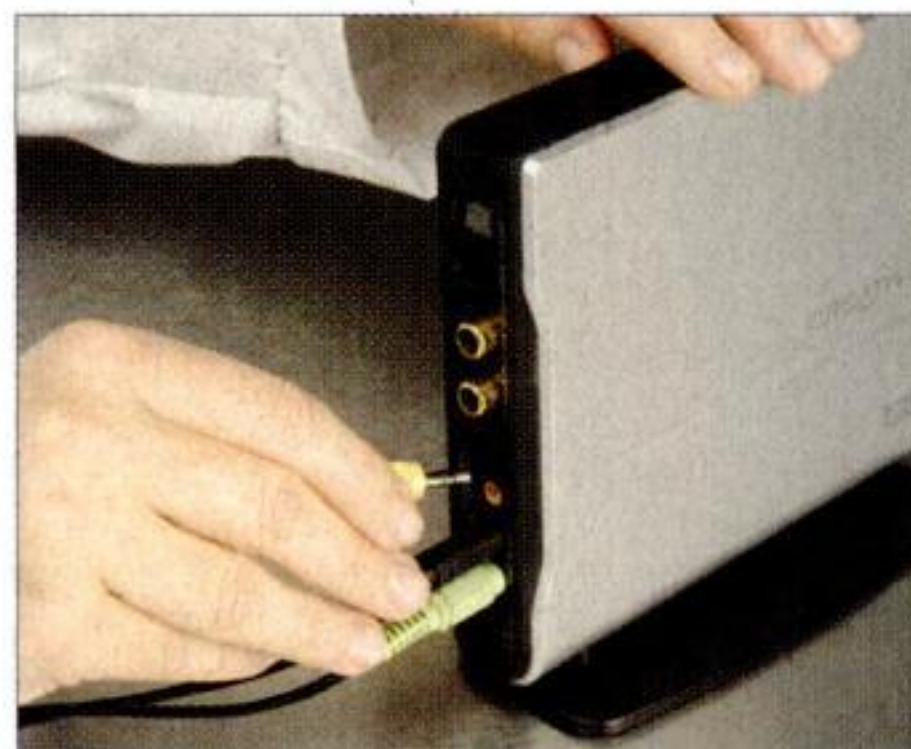
Until Hollywood pulls its collective head out of its collective rectum, you'll only be able to tune in over-the-air HDTV on your PC.

7 MAKE YOUR AUDIO AND VIDEO CONNECTIONS

The audio and video connections you'll need to make are fairly basic. If your video monitor has a DVI or HDMI input, connect it to your videocard using a DVI-to-DVI cable or a DVI-to-HDMI cable, respectively. If you're using a TV monitor that has only analog component inputs, you'll need to use the component-video dongle that came with your videocard. Plug the dongle into the videocard's analog output and then connect it to your television using a component video cable.

We'll assume that you wish to connect your soundcard to your A/V receiver. If you've installed an X-Fi soundcard, your A/V receiver has an available coaxial digital-audio input, and you don't intend to play games on your HTPC, connect the soundcard's coaxial output to the receiver's coaxial input. Audio will stream in the digital domain and your A/V receiver will handle the decoding duties.

If you do intend to play games, you'll need to add Creative's DTS-610 encoder to the mix. Connect this box to your soundcard using three, 1/8-inch stereo cables, and connect the DTS-610 to your A/V receiver's coaxial or optical digital-audio input.



Creative's DTS-610 encoder is an unusual product in that it's absolutely essential for some people's home-theater rigs, and it's entirely superfluous for others'.

8 HOOK UP YOUR EXTERNAL BOXES

If you want to tune in standard-definition TV from your analog cable system, simply plug the coaxial cable emerging from the wall to the threaded F connector on your analog TV tuner card. The coaxial cable carries audio and video information. If you wish to tune in to standard-definition over-the-air broadcasts, you'll need to attach a TV antenna to this same connector. You'll use software running on your PC (e.g., *Beyond TV*) to change the channels on your tuner card.

If you'd like to receive free over-the-air high-definition TV, you'll need to connect an HDTV antenna to the F connector on a digital TV tuner card. Here again, you'll use your PC's software to change channels on the internal tuner.

If you have standard- or high-definition digital cable or satellite TV service, you'll connect the set-top box's analog audio and S-Video outputs to an analog TV tuner card's analog audio and S-Video inputs. The TV tuner and PVR software will digitize the incoming video and audio signals and record them to your hard drive. In this situation, you'll also need to plug an IR blaster into one of the PC's external USB ports. We'll tackle that step next.

9 INSTALL AN IR BLASTER

If you're using a digital cable box or a satellite tuner, you'll need to install an infrared blaster in order to change channels. This isn't necessary if you're making an analog cable connection or tuning in to over-the-air broadcasts (including HDTV) using an antenna.

Jon Rhees' \$50 USB-UIRT is one of the least expensive IR blasters on the market. The IR blaster bundled with Logitech's \$400 Harmony 890 remote control isn't compatible with *Beyond TV*, but Logitech's remote will work with the USB-UIRT; put them together and you can control just about any device you own.

Configuring the USB-UIRT is a simple matter of installing its driver, plugging it into a USB port, and pointing it at your set-top box's IR receiver (or plugging in an emitter and gluing it to the set-top box). We discussed how to teach the USB-UIRT new codes in the section on installing *Beyond TV*.

Setting up the Harmony 890 and its IR blaster is only a little more involved: Install Logitech's software, plug the remote into a USB port, and retrieve any available software updates from Logitech's website; repeat this process with the wireless extender. The next step is to download the appropriate IR codes from Logitech's website.



Logitech's Harmony 890 remote control and IR blaster couldn't be easier to install.



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Fans**



WHAT ABOUT NEXT-GEN DISC FORMATS?

Now that Blu-ray and HD-DVD drives are on the market, you're probably wondering why we didn't include one or the other in our configuration. We left the technology out for a number of reasons, most importantly because we're just not impressed with the quality of movies at this early stage.

We examined several movies—including *The Fifth Element*, *Terminator 2*, and *Serenity*—and were profoundly disappointed with the image quality. It doesn't really matter whether the problem stems from a sloppy transfer, the use of a bad film print, or whatever other excuse the studios might come up with. When we're paying three-to-10 times more for a next-gen optical drive over a tried-and-true DVD drive, our expectations run high. If this is the best they can do, we think both technologies are doomed.

Besides, there's as much room for two high-definition disc formats today as there was for two videocassette standards back in the 1980s. But we did hedge our bets by using the HDCP-equipped version of MSI's GeForce 7600 GT videocard. If six months down the road we decide we want either technology, we can swap out the drive without having to bear the additional expense of a new videocard.

The copy-protection story in relation to next-gen optical drives has evolved during the past several months, but the situation has finally coalesced. Here's the bottom line: If you want to watch high-definition content from either Blu-ray or HD-DVD on a digital display, both your videocard and your display must support HDCP. If you're using a digital TV manufactured within the last few years, there's a good chance the set has HDCP. If you're using a digital computer monitor, your chances are much slimmer.

If your TV doesn't have HDCP but does have component analog inputs, you're set. If your digital computer monitor has neither, you're screwed.

10 SET UP WINDOWS' AUTO EVENTS

If you don't want other automatic events to disrupt *Beyond TV's* PVR functions, you should program these events to occur when you know you won't be recording television content.

The most common automatic events are Windows updates, antivirus and spyware-definition updates, and hard-disk backup sessions. If you've turned on automatic Windows updates in Windows Security Center, you can easily change the time it's set to download those updates, or you can reconfigure the program so that it won't download anything without checking with you, first.

To change Windows updates settings, open XP's Control Panel and choose Security Center. You can immediately see here whether Automatic Updates has been enabled—it will either be on or off. Next, click Automatic Updates at the bottom of this window. If you want to follow Microsoft's recommendation and have Windows download updates automatically (assuming you have a persistent Internet connection, of course), click the radio button labeled Automatic. Choose a day of the week—or every day—from the drop-down menu and enter a time. You'll most likely want to pick a time in the early morning hours, when you're confident the machine won't otherwise be in use.

But because you just might see a program you want to record at some odd hour, a better solution would be to have Windows inform you that an update is available, but allow you the option of downloading and installing it. If that's your preference, choose the option labeled "Notify me, but don't automatically download or install them." This will ensure that none of your software updates interrupts *Beyond TV* in the middle of a recording session.

Because there are many different antivirus, anti-spyware, and backup programs on the market, we won't attempt to cover every variation here. Check the "settings" or "options" menu in your software to schedule downloads at a specific time.



Because Windows' Automatic Update feature might interrupt your recordings, you should consider setting it up so that it informs you when updates are available, but doesn't automatically download them.

11 CONFIGURE BEYOND TV'S 10-FOOT INTERFACE

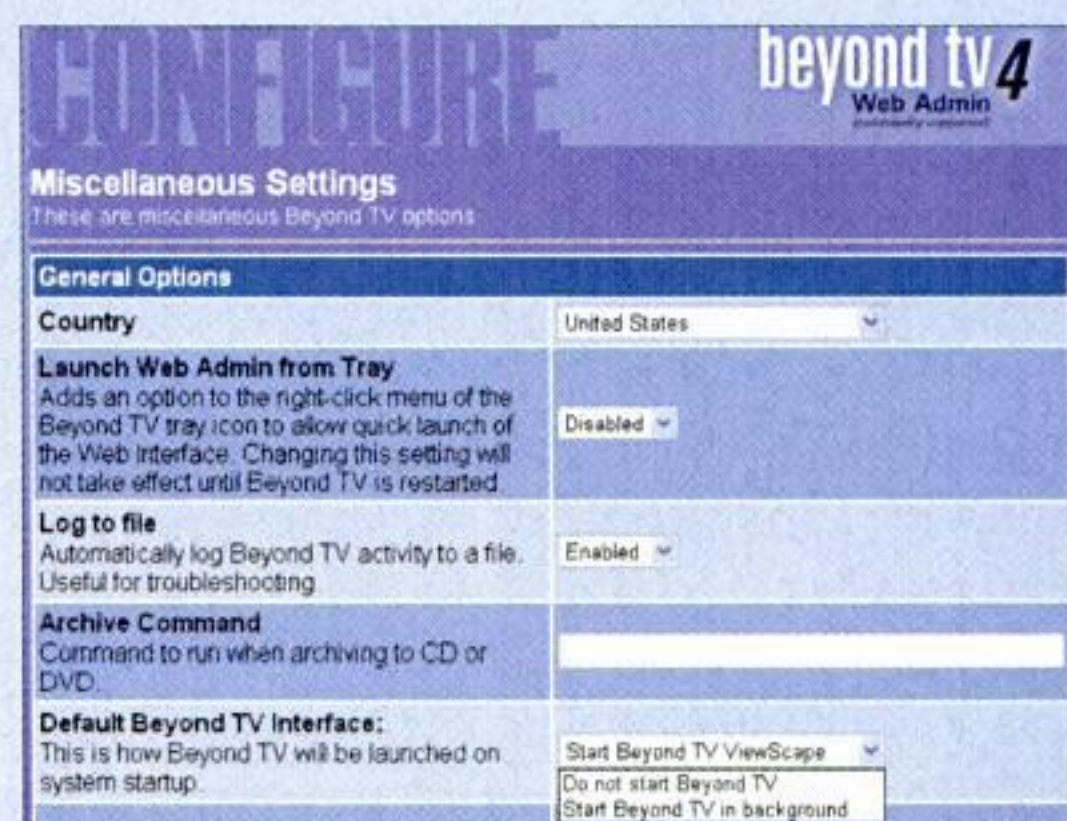
If your home-theater PC is to be dedicated to that purpose, you might want to configure the machine so that *Beyond TV's* 10-foot user interface—ViewScope—automatically launches each time you start your rig.

If you don't, your HTPC will still look like a PC every time you power it up. When we're finished, your PC will boot directly to the *Beyond TV* PVR interface. If you find you don't like this arrangement, you can always change it back so *Beyond TV* starts up in the background.

Right-click the *Beyond TV* icon in the Windows taskbar and choose Advanced Settings to launch the program's browser-based configuration menu. Click Advanced Settings (it's near the top the page, just below the Configure headline), and then choose the menu item Miscellaneous Settings (it's the last one, at the bottom of the page). Locate the menu item Default Beyond TV Interface and select Start Beyond TV ViewScope from the drop-down menu. Click the Save Changes button.

Using your browser's page-back button, navigate back to *Beyond TV's* Configure menu. Now select the menu item labeled ViewScope Settings. Locate Default Starting Screen and choose Home Screen from the drop-down menu. While you're here, you might want to disable the Exit ViewScope Option. This will prevent someone from inadvertently turning off the 10-foot user interface. You should also reduce the resolution of your desktop to the maximum resolution of your TV.

And here's one last tip, which you'll need to set up outside of *Beyond TV*. If you're running antivirus or anti-spyware software, you'll achieve better *Beyond TV* performance if you disable them from scanning the folder where your recorded videos are stored. Do the same for the folder containing *Beyond TV's* application data; specifically, C:\Documents and Settings\All Users\Application Data\SnapStream\BeyondTV.



If you want *Beyond TV's* 10-foot interface to launch automatically when you start your PC, choose this option within Miscellaneous Settings.

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THE FINISHED PRODUCT

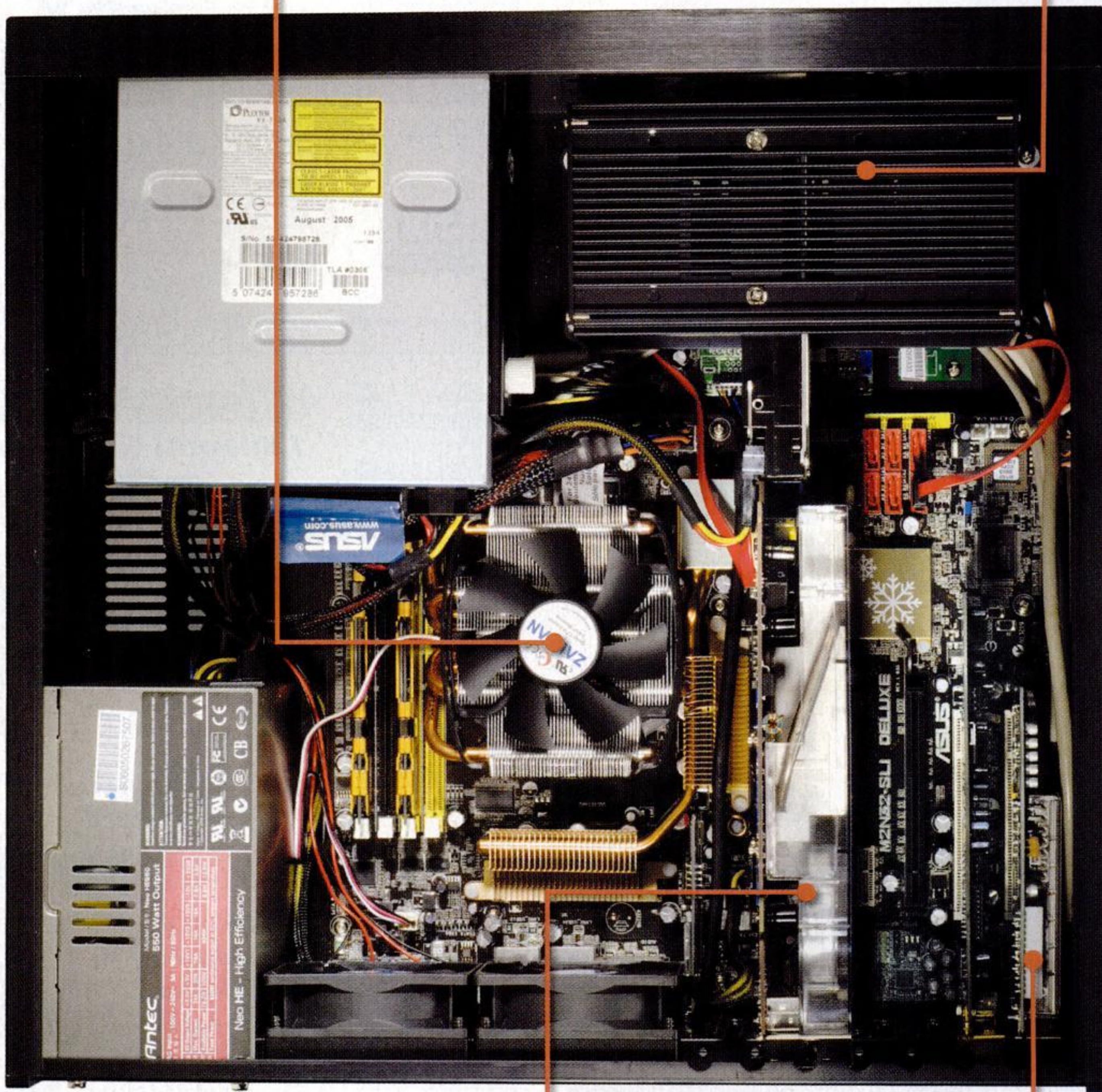
Your typical home-theater PC is a totally different beast than a normal desktop rig. You have to pack a ton of hardware into a tiny space, while keeping everything running cool and quiet. Here's how we made it happen.

WHY NO WATER?

Since we're as concerned about noise as we are about performance, we considered a water-cooling solution for the HTPC, but after much consideration, we ditched the idea. First, the poor airflow through the case would prevent the passive coolers around the CPU socket from catching a breeze. Second, the Zalman CNPS8000 delivers great cooling performance in a low-profile package, without making any noise.

BEHIND THE SCREEN

The touch screen on our Ahanix case is mounted in front of this metal grill, and all the electronics it needs to display an image and respond to controls lie beneath the cage. Additionally, the hard drive is mounted vertically in the cage, as you can see here. Like we said, it's tight in these cases!



QUIET THE GPU

Keeping the GPU quiet is one of our biggest priorities. By using MSI's GeForce 7600 GT, which comes with a large heatsink and a small fan, we were able to run a decent videocard—complete with HDCP support for maximum compatibility with next-gen optical discs. That kicks ass!

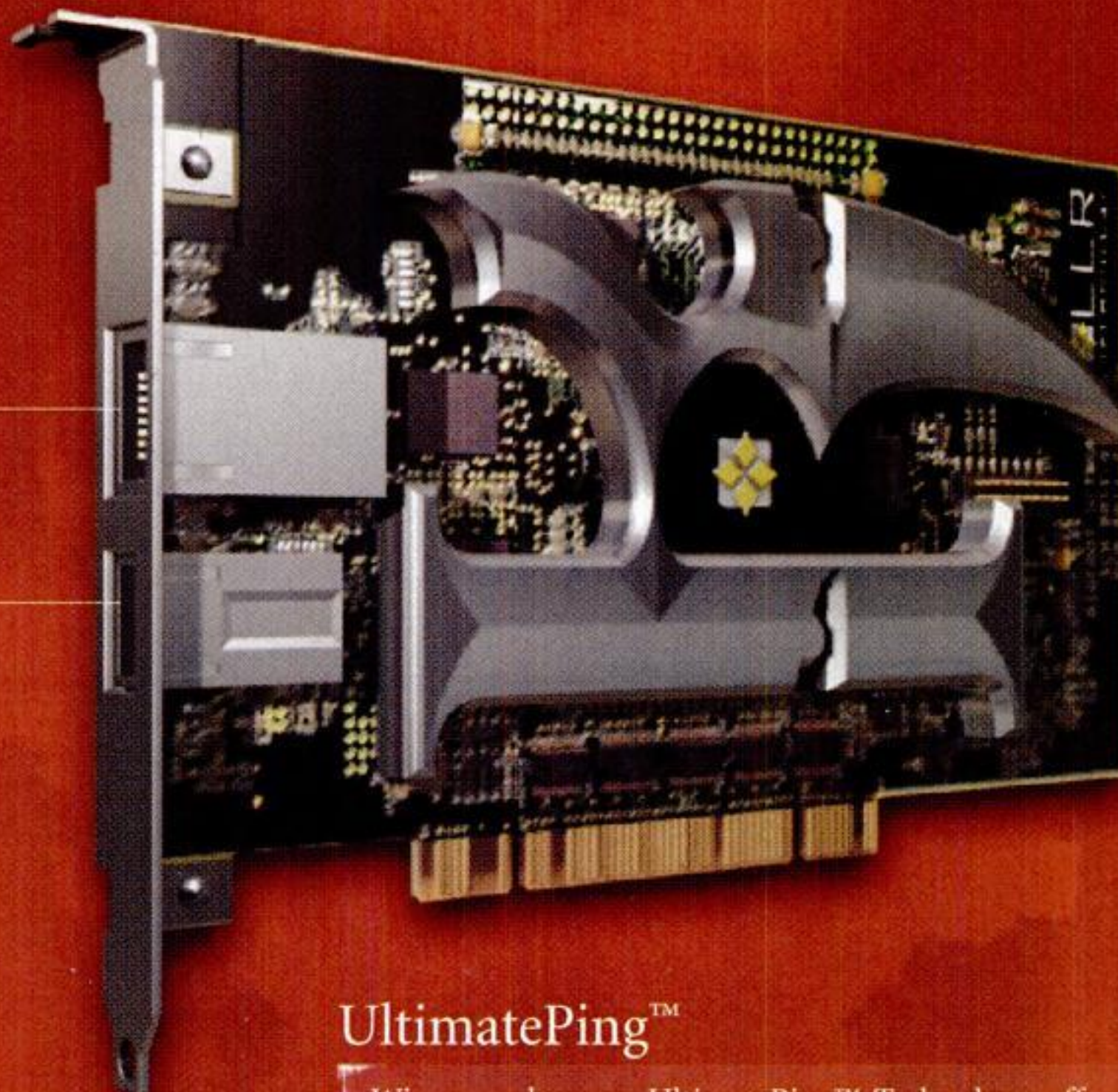
TV GOES IN HERE

Every media center needs a way to capture video. For ours, we chose the Hauppauge PVR-250. While there are more fully featured tuners out there, the PVR-250 works with nearly every piece of PVR software on the market, making it a no-brainer. **MPG**

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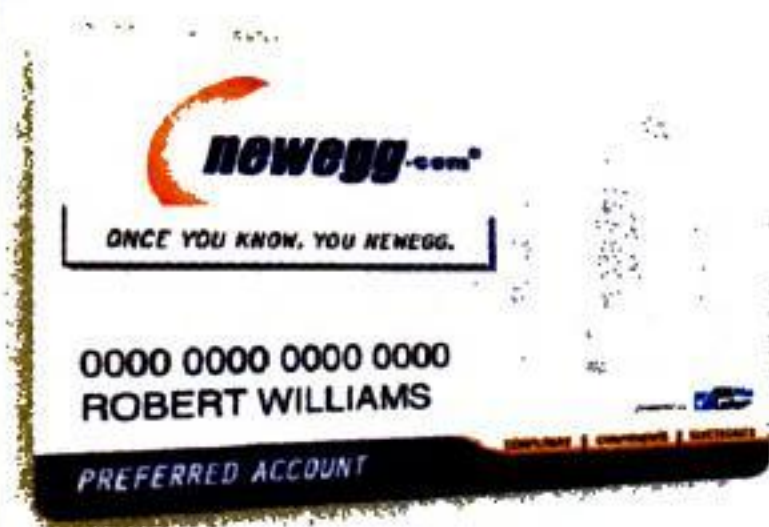
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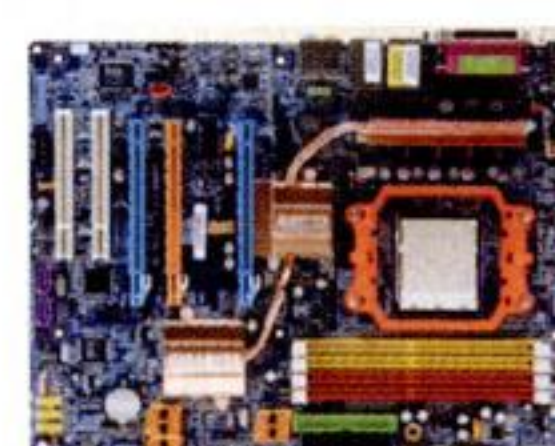
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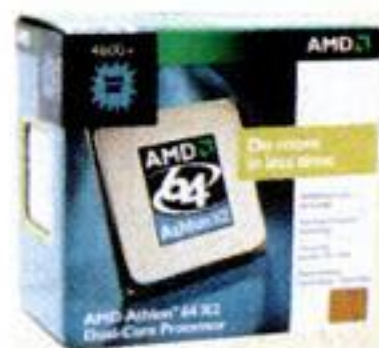


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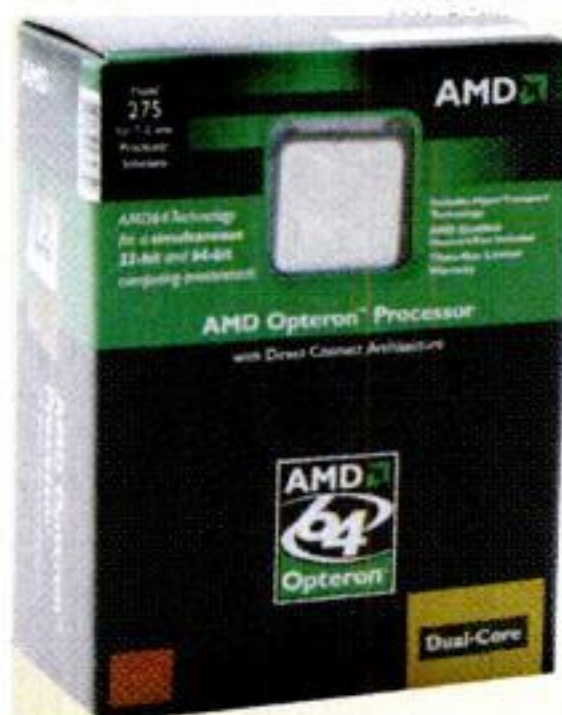
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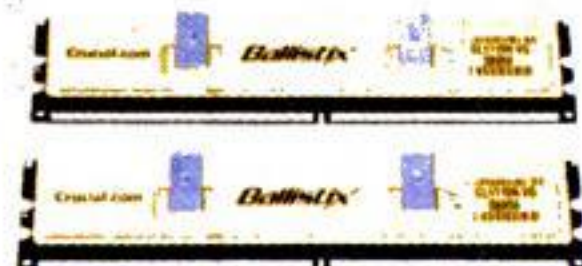


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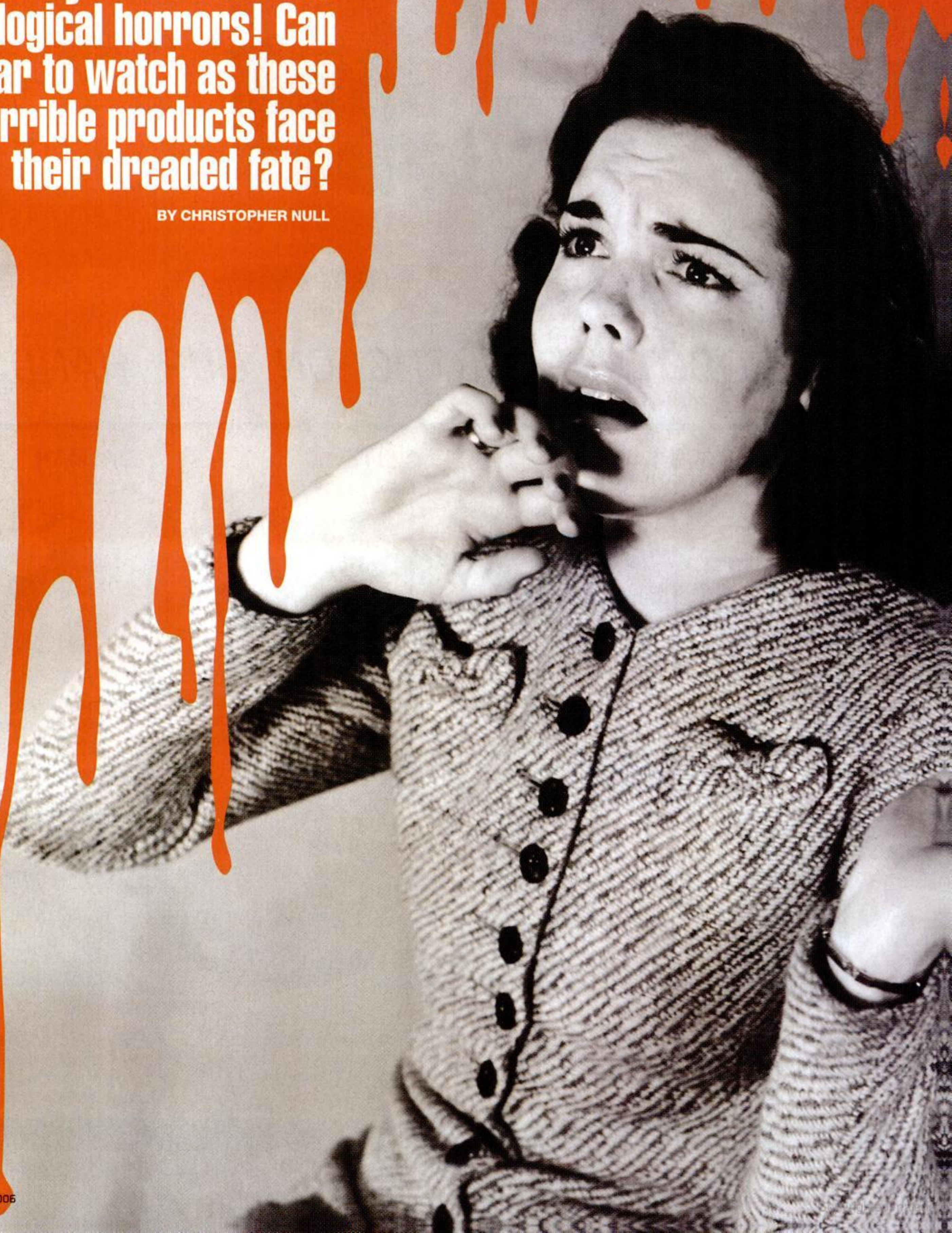
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10 TECH TRAGEDIES

Feast your eyes on these 10 technological horrors! Can you bear to watch as these truly terrible products face their dreaded fate?

BY CHRISTOPHER NULL



At *Maximum PC* we aim to cover only the best technology available, but that doesn't mean we don't run into the occasional "steamer." You know, the kind of product that lands a company in court, puts it out of business, destroys its market share, or all of the above. We're talking about the true tech *tragedies*—the Hindenburgs and Titanics of the Information Age.

How do such terrible products make it to market? Sometimes a technology isn't fully cooked when it ships, and bugs are discovered after it's already in consumers' hands. Because recalls are expensive, companies try patches, bug fixes, and other

nonsense that doesn't always work. Then there's good old corporate hubris, fear, paranoia, and greed. Sometimes corners are cut to save a buck or two, or a little last-minute "tweaking" goes too far. Sometimes people just make bad decisions. And then there's the stuff that was just plain stupid to begin with—we see a lot of that.

So let's reminisce. Join us as we tour the hall of shame that represents tens of billions of dollars flushed down the toilet. At the end, we'll take a closer look at a tragedy that's unfolding before our very eyes. It's just another reminder that those who don't know history are doomed to repeat it.

nVidia NV30

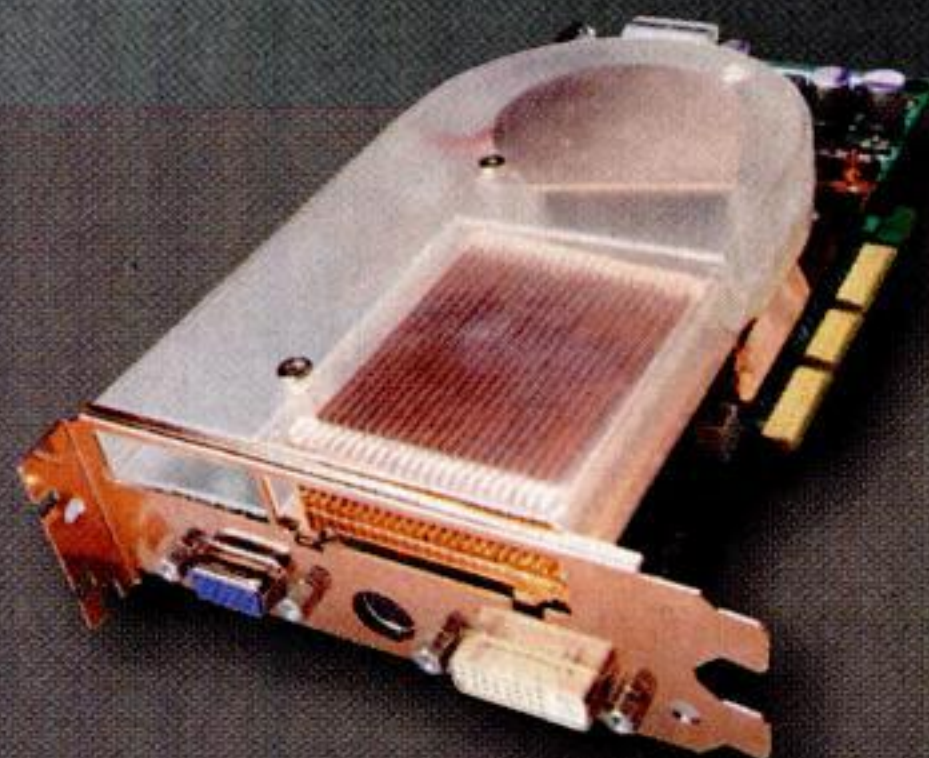
How video nearly killed the video star

Her name was Dawn, and we all loved her fairy wings and elfin ears. Unfortunately, nVidia's gorgeous fairy-based demo couldn't hide the fact that Dawn was naked beneath her wings and pixie dust: The GeForce FX 5x00 cards (code-named NV30), which the impish Dawn represented, stand as possibly the greatest debacle in the still-nascent history of videocards.

After months of hype (and years of dominance), market-leader nVidia launched the GeForce FX 5800 to compete against ATI's Radeon 9700, which had beaten nVidia to market and racked up several favorable reviews. Early benchmarks of the 5800 were promising: 3DMark03 scores were impressive, and nVidia promptly declared victory over the 9700.

It wasn't long before the truth was discovered: nVidia had cooked its drivers to reduce detail and even prevent parts of the benchmark from being rendered. nVidia called the tweaks "optimizations," but when they were removed, the 5800's performance was nowhere near that of ATI's 9700. Later benchmarks would uphold this finding, and high-end FX cards were subsequently relegated to the budget bin with ATI's midrange boards.

To add insult to injury, the card's high



Behold the "leaf blower."

A videocard so loud even nVidia mocked it.

clock speeds (500MHz for core and clock) necessitated an enormous heatsink and fan that took up two slots, versus one for the ATI 9700. Even worse, the fan made a loud sucking sound (ironic, we know) while drawing twice as much power. It was quickly dubbed "the leaf blower," and nVidia even released a video mocking the card—the NV30 was referred to as "the Harley Davidson of videocards."

nVidia cleaned up its act with the totally redesigned GeForce 6 series, but the NV30 fallout took years to recover from. Even worse, it shattered nVidia's credibility, leaving lingering doubts in reviewers' heads about whether the company would "optimize" its drivers again in the future.

Intel Itanium

Iceberg, off the starboard bow!

Itanium was a high-end server CPU announced by Intel and HP way back in 1994. It was designed to extend the Wintel platform into the high-power (and, presumably, high-profit) world of big-iron server computing. The idea made sense at the time: Moore's law dictated that current chip designs would sooner or later reach an architectural limit that would prevent further evolution of that technology. The HP/Intel solution was named EPIC (Explicitly Parallel Instruction Computing), an architecture designed to leverage 64-bit technology (at the time, x86 used 32-bit registers) and be more efficient than existing designs at speculative processing and parallel processing.

After seven years, the partnership actually managed to ship a product. Code-named Merced, the first Itanium CPU ran at up to 800MHz and, rather crucially, could run Windows in various flavors. (About the same time, Intel shipped the first 1.5GHz Pentium 4 chips.) HP called the release of Itanium "a whole new chapter in high-end computing." What a chapter it was.

Immediately upon its release, Merced

was roundly dismissed as a technological disaster and dubbed the "Itanic." Its performance was worse than a similarly clocked x86 processor—and not by a little, but by a staggering 80 percent or more. The technical reasons are complicated (involving the high latency of the L3 cache, the inadequate capacities of L1 and L2 caches, and insufficient cache bandwidth), but the impact was immediately apparent: Nobody bought Itanium servers.

Well, there was one company that bought them: Intel's co-partner HP. That company is the only major Itanium vendor remaining, and sells thousands of five- and six-figure Itanium servers every quarter, worth a few hundred million dollars. (The number-two Itanium vendor, SGI, is bankrupt.) Alas, those sales do little to offset the *billions* of dollars (at least \$10 billion) that Intel and company have invested over the life of the disastrous platform. Sales are nowhere near original expectations.

Meanwhile, Intel released Itanium 2 in 2002, and benchmark results were more in line with expectations, but it was almost



Interesting fact: If you look up the word "boondoggle" in the dictionary you'll see an image of Intel's Itanium processor.

certainly too late. Thanks to AMD's Athlon 64 CPU, 64-bit computing had arrived on desktops, and server users remained happy with existing RISC architectures. Intel's own Xeon server CPU, a relatively inexpensive x86 CPU, greatly outsells the Itanium today.

Shockingly, with billions of losses mounting and the writing clearly etched upon the wall, Intel has no plans to abandon the chip. The Itanium roadmap currently stretches to 2008. And somehow, Intel and HP recently convinced seven other companies (including poor SGI) to funnel \$10 billion more into the thing. What's that saying about a sucker being born every minute?

Powerline Networking

Now slightly faster than SneakerNet!

Powerline networking is one of those ideas that brings to mind the adage, "If it sounds too good to be true, it usually is." Because few houses come pre-wired with Ethernet, it makes sense to use the already-installed electrical wiring that connects every room for networking. There's nothing inherently *wrong* with this idea. But in practice, powerline networking has proven to be an abysmal method for transferring data. Or perhaps that's being too kind.

When so-called HomePlug products were first demonstrated in 2002, they were spec'd at a lowly 14Mb/s, but they couldn't even reach those speeds. Most of the time they operated in the sub-1Mb/s

range, and in some cases were slower than a dial-up modem. The technology could also disrupt your electricity, didn't work with surge protectors, and in the worst possible scenario, could allow a hacker access to your network if he had a long extension cord or lived next door.

Revisions have attempted to correct all of these problems, but *Maximum PC* tests have debunked recent claims that HomePlug has "fixed" its problems. We benchmarked a Netgear adapter in May 2006 that was rated as having 85Mb/s performance, but which operated at a sad 150KB/s. We've reviewed the new "200Mb/s" version of the powerline networking technology on page 96.



Are you or anyone you know using powerline networking? We thought not.



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IBM Deskstar 75GXP

That's not a moon...

IBM's 7,200rpm hard drive, featuring up to 75GB of capacity, arrived in 2000 to rave reviews. Performance was fantastic in early benchmarks, and reviews were glowing.

Then the drives started failing, invariably heralded by an infamous "scratch, scratch, scratch" noise.

Though no specific cause has ever been pinpointed (at least not publicly), the blame has centered on the Deskstar's unique use of glass instead of aluminum for the platter media (IBM claimed this allowed greater data density and stability at high speeds). The resulting problems earned the drive the apropos moniker "Deathstar."

IBM eventually sold its entire hard drive division to Hitachi, which is now handling the class-action lawsuit over the product.



Kenwood TrueX

It's true that this drive really sucked



As CD-ROM spindle speeds approached 10,000rpm, users started to wonder if the end was nigh: Vibration and noise were preventing drives from spinning much faster.

Kenwood figured the solution was to add more lasers (a beam split into seven parts, rather) to read multiple tracks simultaneously, thus obviating the need for faster rotational speeds.

Problems weren't far behind for the "world's fastest drive": It could barely read CD-RW discs, and it had issues with many commercially pressed discs too. Then the drives started dying, and shortly thereafter came the class-action lawsuit. The result? Kenwood stopped making computer components altogether, followed by another payday for the lawyers.

Matrox Parhelia 512

A more apropos moniker would be the sub-Parhelia

The Matrox Parhelia 512 arrived on the market mere weeks before ATI's giant-killer 9700 Pro, and it was the company's last best attempt at regaining some market share in the lucrative 3D market. The Parhelia was initially promoted as a DirectX 9 card, but it soon became clear that this support was only "partial," and as new games were released, performance didn't meet expectations or the games simply didn't work. On top of its lofty \$400 price, the architecture itself turned out to be subpar. When the 9700 Pro arrived, it kicked the Parhelia in the nuts so hard that Matrox abandoned the consumer videocard market for good.



Sony Extended Copy Protection

Hey, I got some sweet freeware with my J-Lo CD!

Was it only last year that Sony took its most recent step toward complete corporate insanity? Perhaps you were affected personally by Sony's Extended Copy Protection (XCP) system, better known as "the Sony rootkit." It wouldn't be a surprise: Sony shipped 4.7 million CDs loaded with the rootkit—a well-hidden, auto-installing DRM application designed to keep you from ripping the CD or transferring songs to any portable device that Sony deemed unacceptable (including the iPod). That was bad enough, but XCP also caused some serious problems in Windows when you tried to remove it: Namely, it could delete your CD-ROM drivers and could render your drive useless.

When this was all revealed on

Halloween 2005, months after XCP had been introduced, Sony's response to the rootkit problem read like an example of how *not* to handle a PR crisis. Thomas Hesse, president of Sony-BMG's digital music division, stated on NPR: "Most people, I think, don't even know what a rootkit is, so why should they care about it?" Turns out, people did care, and though Sony argued that XCP did not represent a security flaw, the ensuing firestorm of criticism forced Sony to release a patch to remove XCP's cloaking features, but this led to even more headaches. Sony required consumers' email addresses to send them the uninstaller, and then claimed in the



In a way, the Sony rootkit debacle was divine justice for people who like crappy music. In another, more relevant way, it was evil.

license agreement that the addresses could be sold to a third party. The uninstaller itself didn't work properly, and it in turn disabled critical security features in Windows.

Four months later, Sony finally said it would "temporarily" suspend the use of XCP, but not before the company was hit with at least 20 lawsuits, including filings from three states and the country of Italy. Sony's code is reportedly now being used as a learning tool for malware creators. Well done, Sony!

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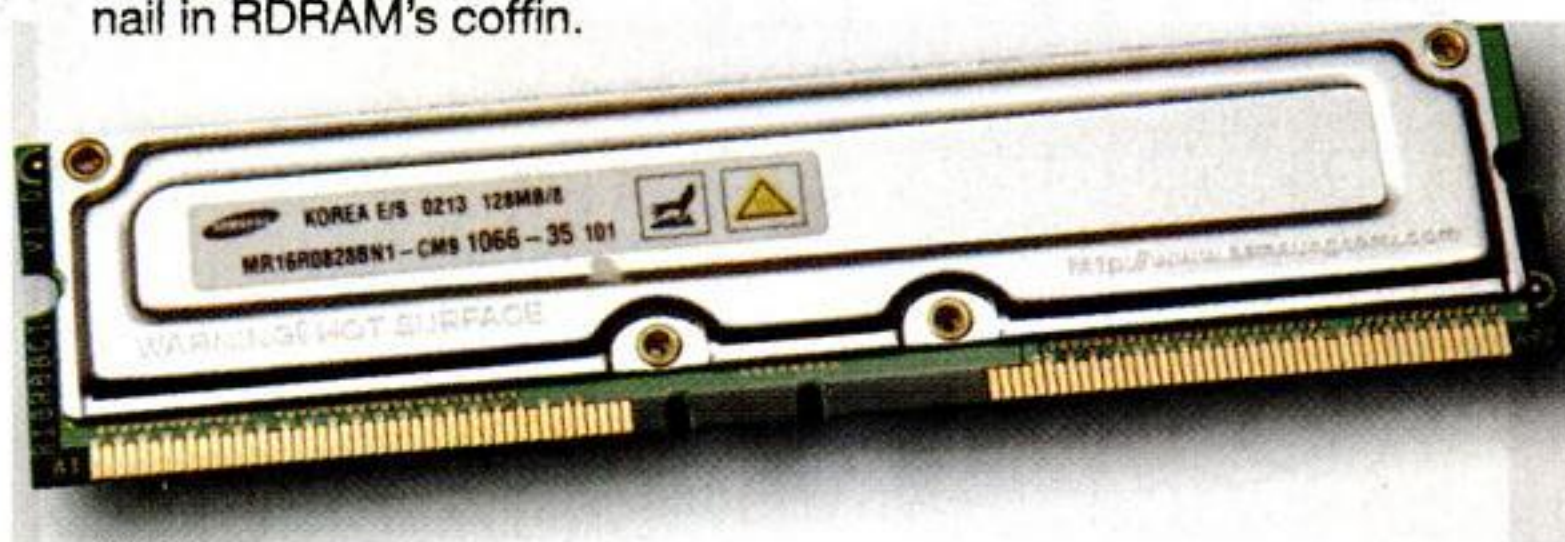
RDRAM

Remember how Intel tried to RAM it down our throats?

In 1999, a company named Rambus attempted to shake up the sleepy, commoditized RAM world with a new type of memory: Rambus DRAM, or RDRAM for short.

Somehow, Intel bought into the idea that RDRAM's radical architecture, which required a special motherboard and heat-sink-equipped RAM sticks called RIMMs, would be preferable to consumers, who were still using easy-to-obtain SDRAM. Oh, and one more thing: RDRAM was ungodly expensive. It was typically two to four times the price of SDRAM, then the industry standard.

Two things made the situation untenable: RDRAM's performance boost hardly merited its extreme cost premium, and the Rambus legal crew started getting pushy, eventually claiming Rambus owned the patent to not only RDRAM but also SDRAM. A glut of lawsuits ensued (including an antitrust charge against Rambus), and Intel was forced to drop the technology in favor of the peoples' choice—SDRAM. This was the nail in RDRAM's coffin.



Intel i820 Chipset

A tale of two RAM types

And while we're talking about RDRAM.... Intel was so hot on the stuff that in 2000 it quickly commissioned a motherboard to take advantage of this great little memory technology. When consumers balked at RDRAM prices, Intel came up with a solution that would work for RDRAM and SDRAM alike—or so it thought: the Memory Translator Hub (MTH), which would let RDRAM motherboards work with SDRAM memory.

Well, it simply didn't work, and MTH-equipped i820 (code-name "Camino") mobos were so slow and crash-prone that Intel ultimately gave up, recalling every MTH system it had sold—close to a million buggy boards at a price of half a billion dollars. hilariously, the problem turned out to be fixable by adding a single resistor to the MTH. Most consumers not only got new motherboards, they also got free RDRAM as well. The disaster was eventually dubbed "Caminogate."



A Tragedy in the Making: HD-DVD vs. Blu-ray

Enough problems to make you yearn for Betamax

Don't look now, but high-tech disasters have hardly gone away. In fact, there's one in our midst as you read this, and it will have a devastating impact on many people, including you, me, and every other lover of high-def content.

The technology is next-gen optical, and its development has been plagued by bickering, delays, and a bloody format war that saw both parties walk away from the bargaining table. But while the world has been focused on the feud between the two competing standards (Blu-ray and HD-DVD), less has been written about the fundamental flaws of both technologies. Fortunately, the facts are now creeping out.

Big problem #1: Does your TV have an HDMI port or DVI port that supports the HDCP encryption standard? You'll

definitely want the encumbering tech if you buy into a next-gen optical format. If you connect a high-def player using any analog technology, your movies can be arbitrarily down-converted to 580p, nearly the same resolution you get with a regular DVD disc. Why? The usual reason: Studios are scared you'll make a perfect copy of *Crossroads* and distribute it on BitTorrent. Same goes for the digital connection between your videocard and monitor; if you want to play content on your PC—both components must be HDCP-compliant or your movies simply won't play. Your only playback option is to use the craptacular down-converting analog connection. For more on this issue see In the Lab on page 76.

Big problem #2: Worse than the ill-conceived content protection schemes



is the kill switch built into all Blu-ray and HD-DVD players. If miscreants or information pirates find an exploit in a particular model of hardware that allows them to illicitly copy content or bypass the DRM schemes, future software simply won't work on any of that model player until the firmware has been updated. Say your hardware vendor went out of business: Your only recourse is to buy a new player, at least if you want to watch new discs.

For more on strangling a technology before it gets to market, see DVD-Audio and SACD. [E]

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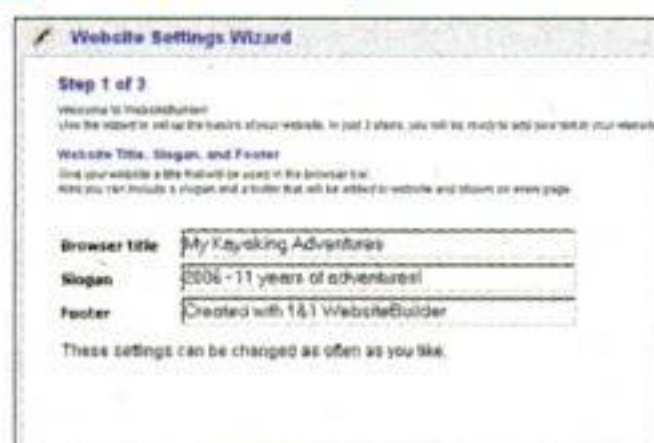
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Make Your Own Machinima

Create your own summer blockbuster Hollywood war movie using in-game footage.

TIME
2:15
HOURS:MINUTES

You just had the greatest game of *Battlefield 2* in your life—too bad none of your friends will believe you. “But, but, but...,” you’ll say, as you try to convince your buddies that you made a headshot with a .50 caliber M95 sniper rifle from across the map. Or that you killed a pair of rampaging armored personnel carriers with mines. By making your own trophy video, you can impress your friends, and maybe even score a sweet development deal with Jerry Bruckheimer—if your homegrown action flick is entertaining enough!

BY GORDON MAH UNG

MATERIALS

- **BATTLEFIELD 2**
A game that lets you record in-game demos with a movable camera
\$50, www.ea.com/official/battlefield2/us
- **BEEPA FRAPS**
A utility to capture video from the game engine
\$37, www.fraps.com
- **PREMIERE ELEMENTS 2.0**
A video editor
\$80, www.adobe.com

See the *BF2* movie we made on this month's disc, or at MaximumPC.com.

1 Play the Game

It doesn't get any easier than this. Fire up *Battlefield 2* and look for a server that supports the game's BattleRecorder feature. BattleRecorder lets the server record everything that happens in the game on the server side, so you have a record of all the events that transpired during the entire game. You can tell which servers support BattleRecorder by using the BattleRecorder filter in the in-game server browser, or by looking for the BattleRecorder icon by the server name (it looks like a TV screen). Once you've found your server, just jump in and play.



2 Download Your Demo

When the round is over, hit Escape and go to the Community tab of the main *BF2* interface. On the left side, under BattleRecorder Bookmarks, you'll see the files available for download. Simply click one, and hit download. If you get an error, the server you were on probably doesn't have the recorder mode properly configured. In that case, you'll have to look for a properly configured server, using trial and error. We find that most of the properly configured servers will let you download the file after the match is over. (Note: If you wait too long, most servers will have purged the file, even though *BF2* will still indicate that it's available for download.) Once you've downloaded the file, it should appear on the right-hand side of the screen under BattleRecorder Library. Select the demo and click Play File. *BF2* will load normally, but instead of the usual spawn point screen, you'll find yourself in an observer mode, sometimes off the map. If the demo works, you're good to go. Add the server to your Favorites and consider it your own little Hollywood back lot.

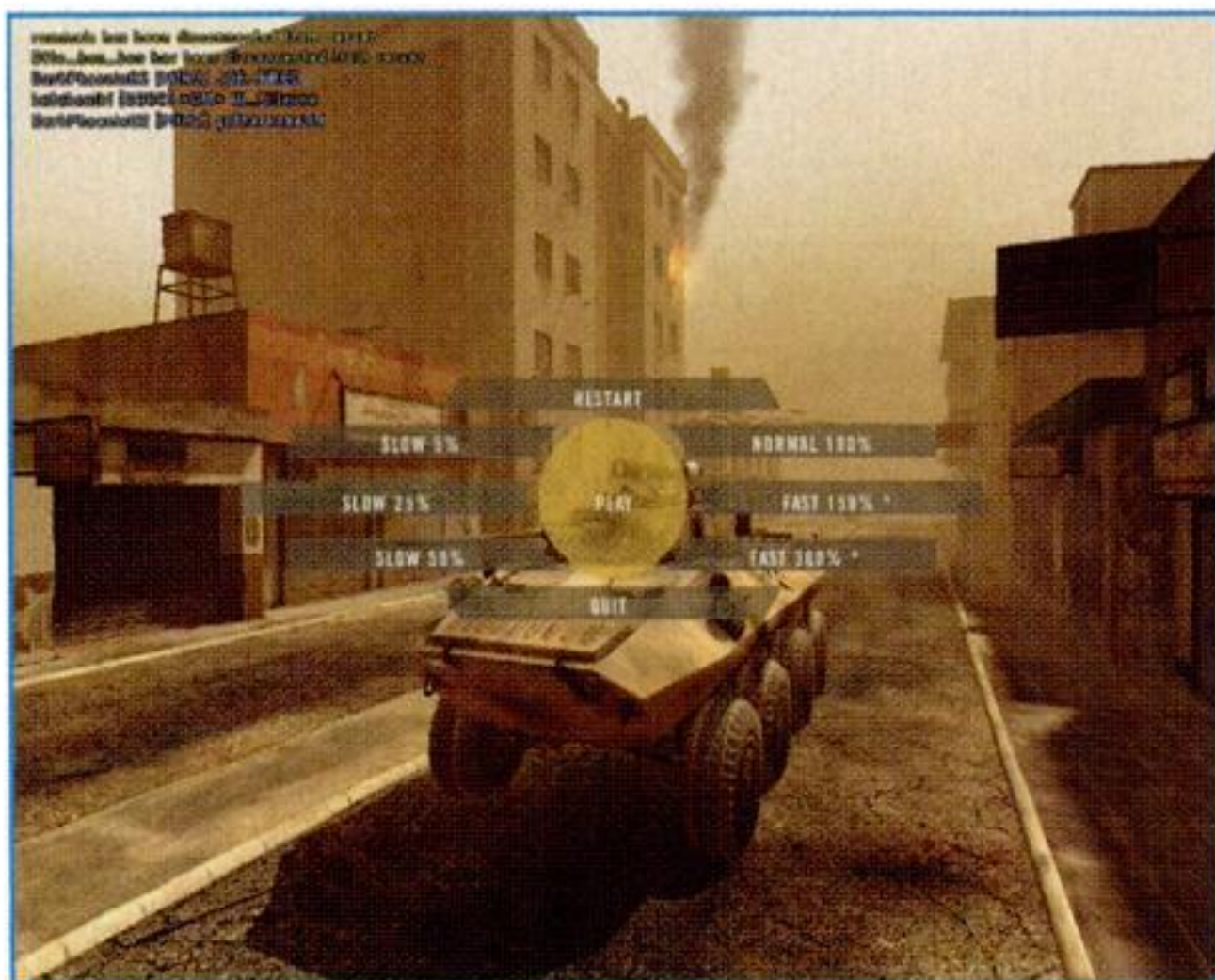


3 Fraps It

OK, you've downloaded your video and verified that it works. Now exit *BF2* and fire up *Fraps*. You'll use *Fraps* to convert your onscreen play to an AVI file that can be edited by any video editing program. *Fraps* is a fantastic tool that everyone who is into computing performance and gaming should own. It lets you capture screenshots and videos from any application, and it can even display an overlay of the frame rate of a DirectX or OpenGL game. Its usefulness extends beyond this how-to, so it's definitely worth \$37. *Fraps*' default video capture key is F9. *Fraps* should default to capturing video in full frame mode at 29.97fps, perfect for our project. Keep *Fraps* running, then start *BF2* again and load up your demo file.



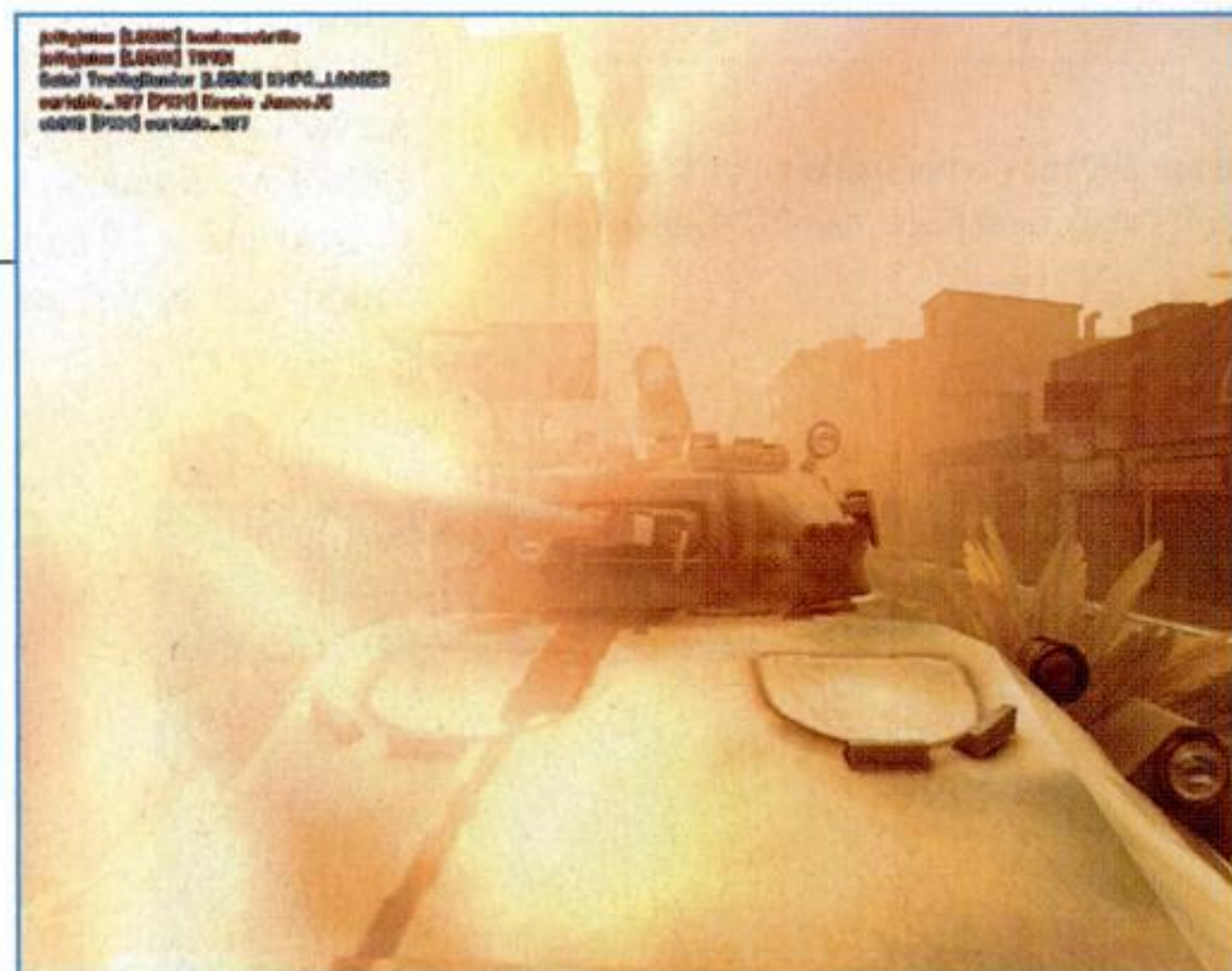
4 Be a Cinematographer



When the demo's playing, hitting the Q key gives you the ability to pause, play, speed up, or slow down the playback of the demo. The demo starts in freelook mode, allowing you to fly around the map using the normal WASD keys and the mouse to change directions. The mouse's right-side button switches between freelook and locked-on-an-individual modes. Hitting the space key toggles through all the players in the game. Once the camera locks onto a player, the mouse will let you orbit the camera around the player while the mouse's scroll wheel zooms the camera in and out. You can fly around the map looking for the particular "scene" you want, or if you want to capture your own acts of valor, simply follow yourself.

5 Action!

You're ready to record yourself smoking five OPFORs with the M9 Beretta. You should shoot the first take as a "tracking shot" just over your shoulder. Queue up the scene to just before it's about to start and hit Q to pause playback. Hit F9 to start *Fraps*' capture mode, then press Q to restart playback. When the scene is over, hit F9 to stop *Fraps*. Hit Q, select Restart, and queue up the scene again. Repeat the sequence by shooting the same scene from different angles so you'll have lots of options to get the best action when you're editing your footage. You should also "film" some B-roll footage—a close-up of the muzzle or a long shot down an empty street—which you can cut into the main scene for spice.

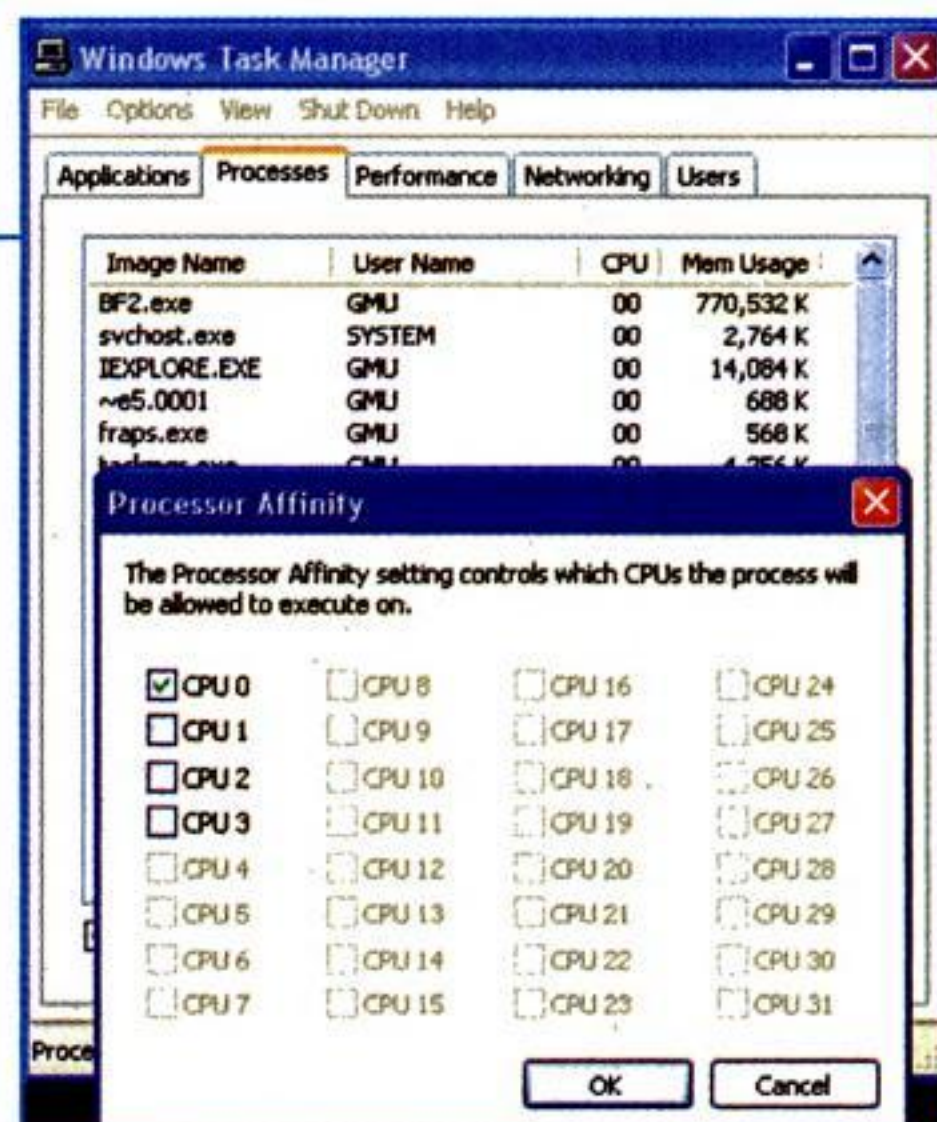


6 Performance Problems?

Running *Fraps* in recording mode at the same time as *Battlefield 2* can put a strain on older machines. Running 2GB of memory in your rig will likely alleviate performance issue—*BF2* loves RAM. If

you have a dual-core processor, you might want to set the affinity of *BF2* to run on a single core. *Fraps* seems intelligent enough to confine itself to one core, so by setting it to the other core you

can help ease the strain on your system. To do this, you need to open Task Manager and click the Process tab. Right-click BF2.exe and select Set Affinity. Uncheck one of the processor cores, and close Task Manager.



7 Time to Edit

By default, your captures will be saved to the C:\fraps\ folder. If your PC has enough horsepower, you can just leave BF2 running in the background while you alt-tab out. This makes it easy if you decide you're not happy with a certain scene and want to reshoot it, but you should probably shut down the game when you open your editor. We used Adobe's *Premiere Pro 2.0* because we had it installed on our test bed, but *Pro* is overkill for this project. Adobe's \$80 *Premiere Elements* will handle the job just as well, and because both apps share many features, all of our editing

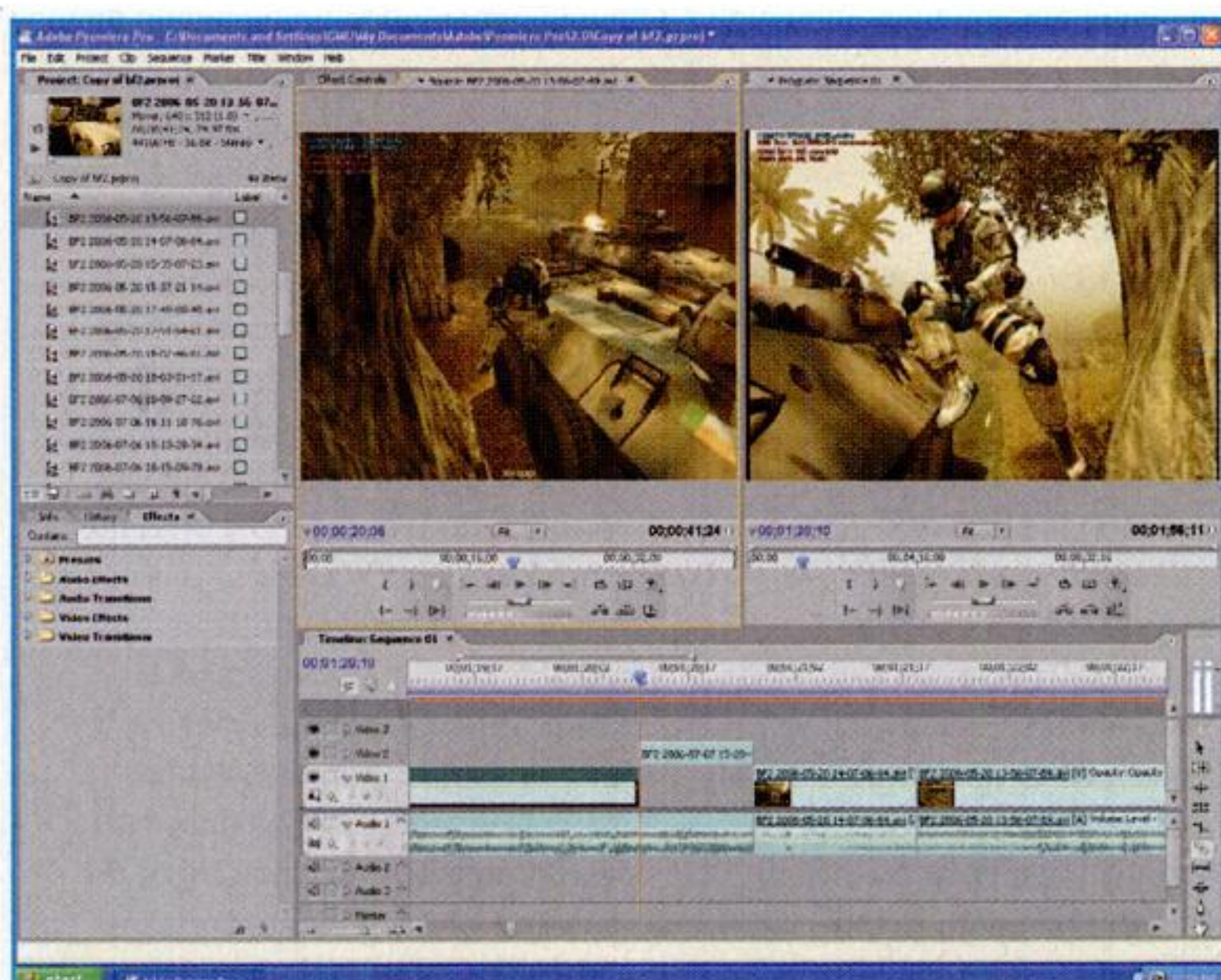
tricks will work in either app (except where noted).

To get started, import your AVI files from the *Fraps* directory into *Premiere* by right-clicking the Program pane and clicking Import. Point it at the C:\fraps\ directory and grab the appropriate files. Pick your scene and drag it from the Project tab into the timeline. Now trim the footage until it's just what you want. You can do this by selecting the clip on the timeline and grabbing the end until a red bracket shows up, slide it left or right to make your cuts.

8 Add Some Fast Cuts

Any student of Michael Bay can tell you that following the action from only one angle gets boring fast. Because all of your scenes are of the same subject but shot from different

angles, all you need to do is splice them together in a visually stimulating way. In our video, we follow our Marine engineer over his shoulder as he drops mines in front of the two



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rampaging APCs. Then, as the Marine reaches the top of his arc, we switch angles so the camera is in front of him. Finally, we switch to a third shot with the camera in freelook mode that shows our Marine running past the APC as he drops another mine. When all three scenes are edited together, it's an exciting montage.

But we need the soundtrack to be continuous. If you don't sync the audio perfectly, there will be distracting pops

and clicks as the video clips change. The easiest way to make the audio perfect is to use the soundtrack from a single clip, then sync the video with that. We took our audio from our unedited over-the-shoulder shot by right-clicking the clip and selecting Unlink. *Premiere* only displays video from the topmost timeline, so if you place the unedited video track below the edited video in your timeline, you'll see only the edited video. Get your edited clip synchro-

nized with the audio track, then right-click the edited clip and select Delete Audio to remove the excess audio.

Then, switch back to the selection tool by hitting "V" and go through the same process for all of your clips. Remember, don't always keep the camera on your virtual actor. You can cut between the action of the object firing and object being fired upon for more drama.

9 Slow It Down

What would a modern war movie be without slow motion? When the APCs open up on two hapless Marines running down a hill in our movie, we splice several scenes together and add a slo-mo effect. To do this in your movie, select the scene you want to slow down and use the razor tool to cut it on the timeline. In *Premiere Pro*, you right-click the selected scene and select Speed/Duration. In *Premiere Elements*, select the scene and choose Time Stretch. You can also apply the fast-cut technique to change camera angles. In our example, we follow the Marine in slow-motion from the front, and then from over his shoulder, and then back to the front, in slow motion, when he takes a hit. We close with a shot as he and his buddy lie crumpled on the ground with the firing APC in the background. That's powerful stuff.



10 Add Titles and Transitions

Titles will help explain your story so add them where they're needed. In *Premiere Elements*, create a title by selecting the Title button on the upper right-hand side of the screen. The title will show up as an asset in the Project tab on the left side of the screen. To add it, drag it from the Project tab to video track 2 in the timeline. You can change the opacity of the title by right-clicking the title in the timeline and choosing fade-in and fade-out. A thin line in the timeline's video track will also let you manually change the opacity or transparency. The method is similar in *Premiere Pro 2.0*. Select Title, then New Title, and pick your style. Like *Elements*, once you've

entered the title, it shows up in the Project tab as an asset. Drag this over to the timeline into video track 2 or 3, over the spot where you want it to appear. You can change how long the title is on the screen in either application by grabbing the end and dragging it to change its length. The easiest way to set opacity in *Premiere Pro 2.0* is to set it under Title Properties when you create the title. Otherwise, you can adjust opacity by clicking the Title after it's been placed in the timeline and bringing up the Effects window.



Add a Soundtrack or Voice-Over

We didn't add a soundtrack to our small video for copyright reasons, but it's easy to do. Go to the Project tab on the left side of the screen in either version of *Premiere* and click Import. Point it to your favorite MP3, such as Samuel Barber's *Adagio for Strings*. Once it's in the asset list, you can drag and drop it onto the audio 2 or audio 3 track.

If you're really ambitious, and want to record a voice-over or dialogue to go with your movie, simply record them as WAV or MP3 files, add them as assets, and drag them into the part of the timeline where your soldiers are "speaking." **MPC**

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Ask the Doctor

SLI MIX-N-MATCH

I have an XFX GeForce 7900 GT with 256MB of memory. The core is clocked at 520MHz and the memory runs at 750MHz. I'd like to pair that with an EVGA GeForce 7900 GT, but this card's core runs at only 500MHz (its memory is clocked at 750MHz, same as the XFX). Is it OK to run these two cards together?

—George Shock

As long as you're using Forceware release 80 or higher, you can mix and match any two GeForce videocards based on the same GPU. Each GPU and frame buffer can be clocked at a different rate, and they can even have different-size frame buffers. You must also have an SLI motherboard, of course; but you already knew that, right?

GOING WIDE

I recently bought this beefy 21-inch widescreen display from Gateway. It's equipped with a DVI-D connection, but my videocard—a Radeon X700—has a DVI-I port. I've been searching for a videocard with DVI-D, but I can't find one. Any advice?

—Joe De Luna

The only difference between DVI-I and DVI-D connectors is that the former carries both analog and digital signals. Five pins (two round ones above and two below a broad flat pin) on the left side of the connector carry analog signals for connecting to an analog monitor. The pins that carry digital information are exactly the same on a DVI-I cable as they are on a DVI-D cable, so your Radeon X700 should work with that monitor. For best results, set the videocard to the display's native resolution. You didn't indicate the model number, but if it's the FPD2185W, that would be 1680x1050.

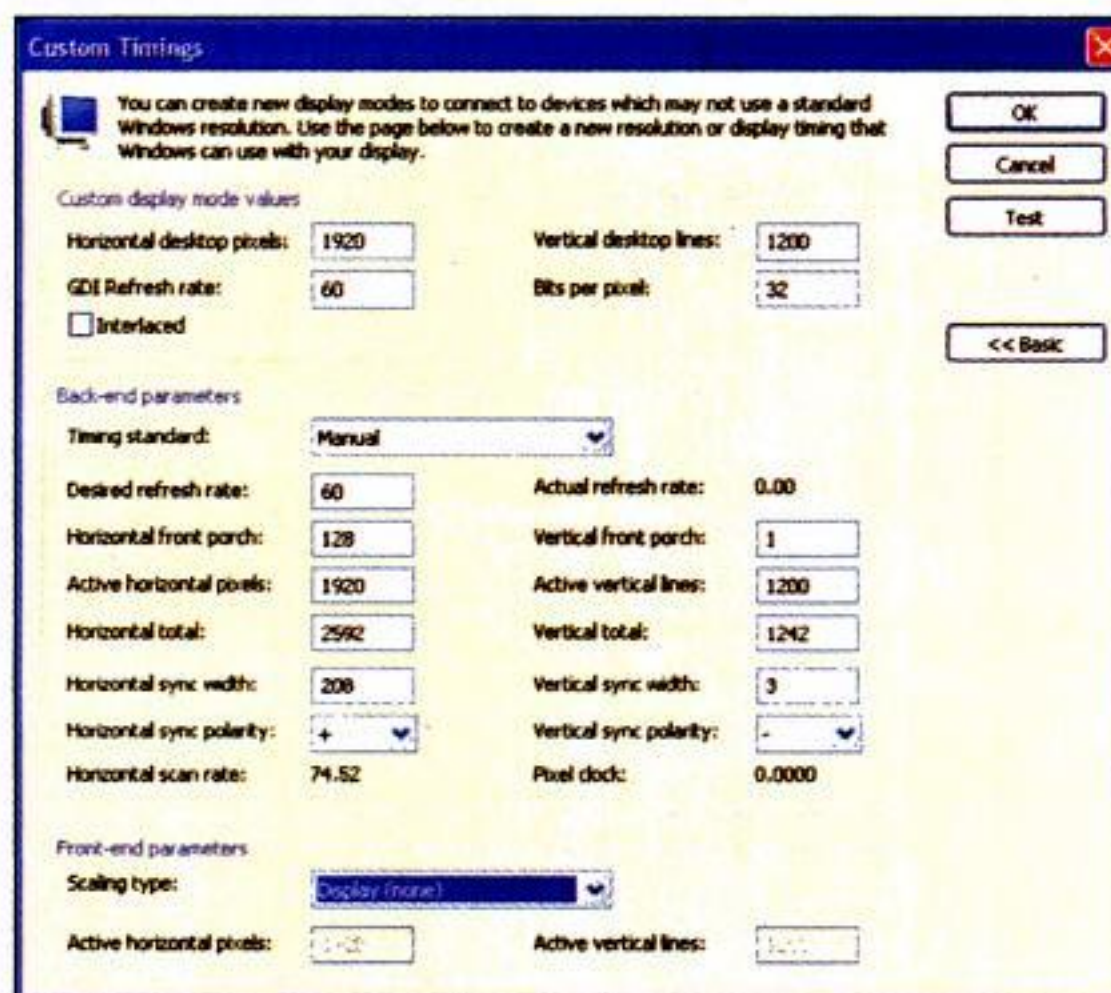
TIME SYNC

I'm having trouble connecting my Windows XP PC to my Philips CRT HDTV. I bought an HDMI-to-DVI cable, but I don't get any picture when I hook up my PC to the TV. I have an AGP version of nVidia's GeForce 6600 GT with 128MB of memory, and I'm running the latest Forceware drivers. Do I have the right cable, or do I need a DVI-to-HDMI cable?

—Brett Walton



If double, double, toil and trouble is an apt description of your PC's condition, seek the Doctor's counsel. He'll toss a little eye of newt and toe of frog in his cauldron and whip up a curing spell for ye. Email the doctor@maximumpc.com.



nVidia allows you to create custom timings for HDTV monitors, but consult your TV's manual before going down that path: Incorrect timings can permanently damage your set.

As long as you have a cable with a DVI connector on one end and an HDMI cable on the other, you have the right cable. I suspect your problem is either that your videocard is set to a resolution your monitor can't display, or that it's set to a scan rate your monitor doesn't understand. Connect your computer to a computer monitor and set its resolution to your TV's native resolution. If your TV still won't display a picture, you might need to tweak the videocard's scan rate. Connect your PC to a computer monitor again and go into the videocard's display properties. Click the Advanced Timing button and set the horizontal and vertical frequencies to the correct values for your TV (these should be listed in the owners manual). Warning: Setting the incorrect values could permanently damage your display.

SHAKE-N-BAKE

I recently moved and my computer was jostled around a little. I didn't think too much of it, as I often take my PC to LAN parties. When I first connected it at the new place, it started fine but shut itself off after a few minutes. I started it up a second time, and the same thing happened after about 10 minutes. On the third try, the system got as far as the

Windows loading screen, where it stayed for a couple minutes before rebooting. I've reseated all the cards in their slots and

double-checked all the connectors. What else could it be?

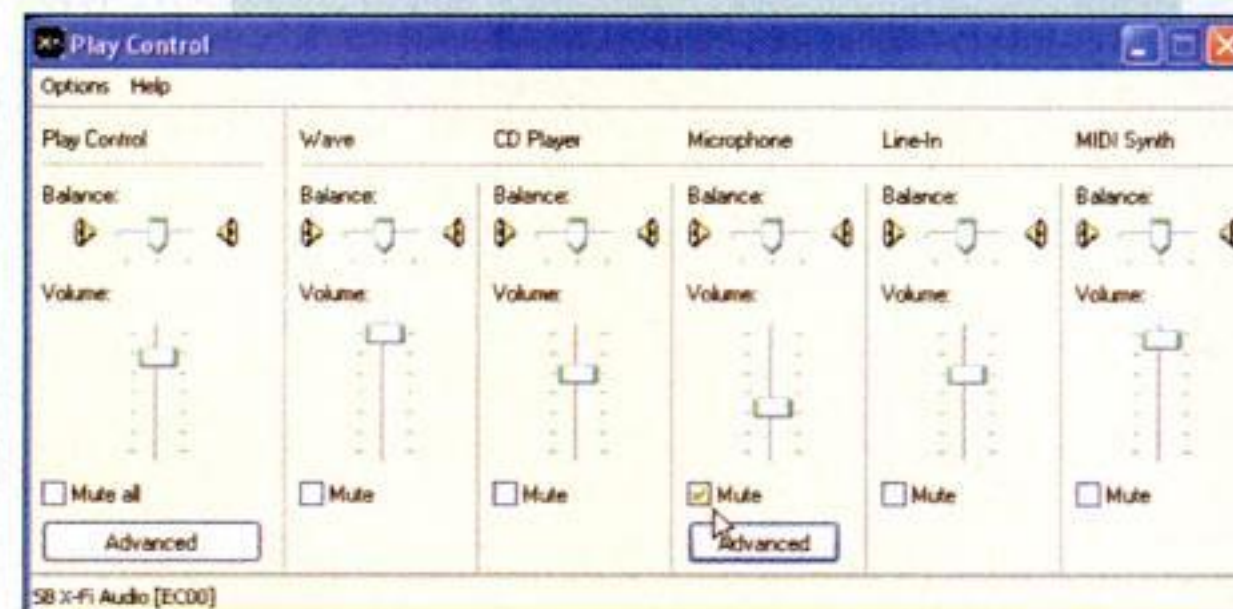
—Ethan Jackson

You've already checked the most obvious possibilities, but you might also try removing and re-installing your CPU's fan and heatsink. An overheating CPU is one of the most common causes of premature shutdown, so it could be that the frequent moves have opened a gap between the top of the processor and the bottom of the heatsink. Use alcohol to remove any residual thermal grease from the heatsink and CPU, re-apply a small amount of fresh material, and lock down the heatsink again. **MPE**

SECOND OPINION

I had a PC some time back that produced a "low buzz" like the one described in "Catching a Buzz," in your July column. Well, it was really more like a "low buzz from H-E-double-toothpicks," if you know what I mean. Anywho, I finally gave up and called tech support (yeah, yeah, I'm a geek failure), who had me double-click the speaker icon in the system tray to see if Mic Volume was muted or not. It seems that if you don't have a microphone plugged in, and Mic Volume is not muted, the audio pickup circuit will pick up noise as you drag the cursor across the desktop. Talk about sensitive!

—John Steedley



Troubleshooting noise in your PC? Try muting your mic input if there's no microphone plugged into it.

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White Paper: SMART Hard Drives

Like a canary in a coal mine, the Self-Monitoring, Analysis, and Reporting Technology (SMART) in today's hard drives can warn you of impending doom. Here's how it works.

BY JOSH NOREM

Few situations in life suck as much as losing a hard drive, especially if you haven't backed up the data stored on it. The experience can be so painful and upsetting that the enraged victim swears off that brand of hard drive forever, denouncing that company's products as unreliable and untrustworthy.

Hard-drive manufacturers are acutely aware of this phenomenon and the threat it poses to their business, and they become especially conscious when the customer in question is a massive corporation with mission-critical data at stake.



If your hard drive is failing, SMART might issue a warning such as this one during POST. Press F1 and back up as soon as possible.

But everyone knows that hard drive failure is inevitable: These are mechanical devices operating in a sealed environment; you can't just pop up the hood on one and give it an periodic tune-up. Whether the cause of death is old age (the spindle-motor lubricant will dry up eventually, and bearings don't last forever) or—shudder—a manufacturing defect, no drive can live forever.

Because hard-drive manufacturers

can't prevent eventual drive failure, they've developed self-monitoring, analysis, and reporting technology (SMART), an early-warning system that can at least help you avoid catastrophic data loss. SMART, which has been integrated into hard drives since 1996, continually monitors the drives, on constant look-out for signs of trouble. It then reports to you, letting you know either that everything is OK or that the time has come to *really* back up your data and go drive shopping.

PREDICTING FAILURE

Some hard-drive failures are predictable; others aren't. Unpredictable failures—sudden physical trauma, for instance, or a lethal power surge—are largely beyond manufacturers' control. Predictable failures, on the other hand, are much easier to manage. These "slow-death" malfunctions are typically caused by the gradual degradation of a drive's components, and they account for the vast majority of hard-drive breakdowns.

During the development of SMART, drive manufacturers performed autopsies on scores of failed drives returned from customers. Just as in a human autopsy, they were seeking to determine the exact cause of death. Once they'd accumulated a statistically meaningful number of these examinations, commonalities began to emerge; they detected tell-tale symptoms that proved to be precursors to crashes. And they established thresholds that, once crossed, all but

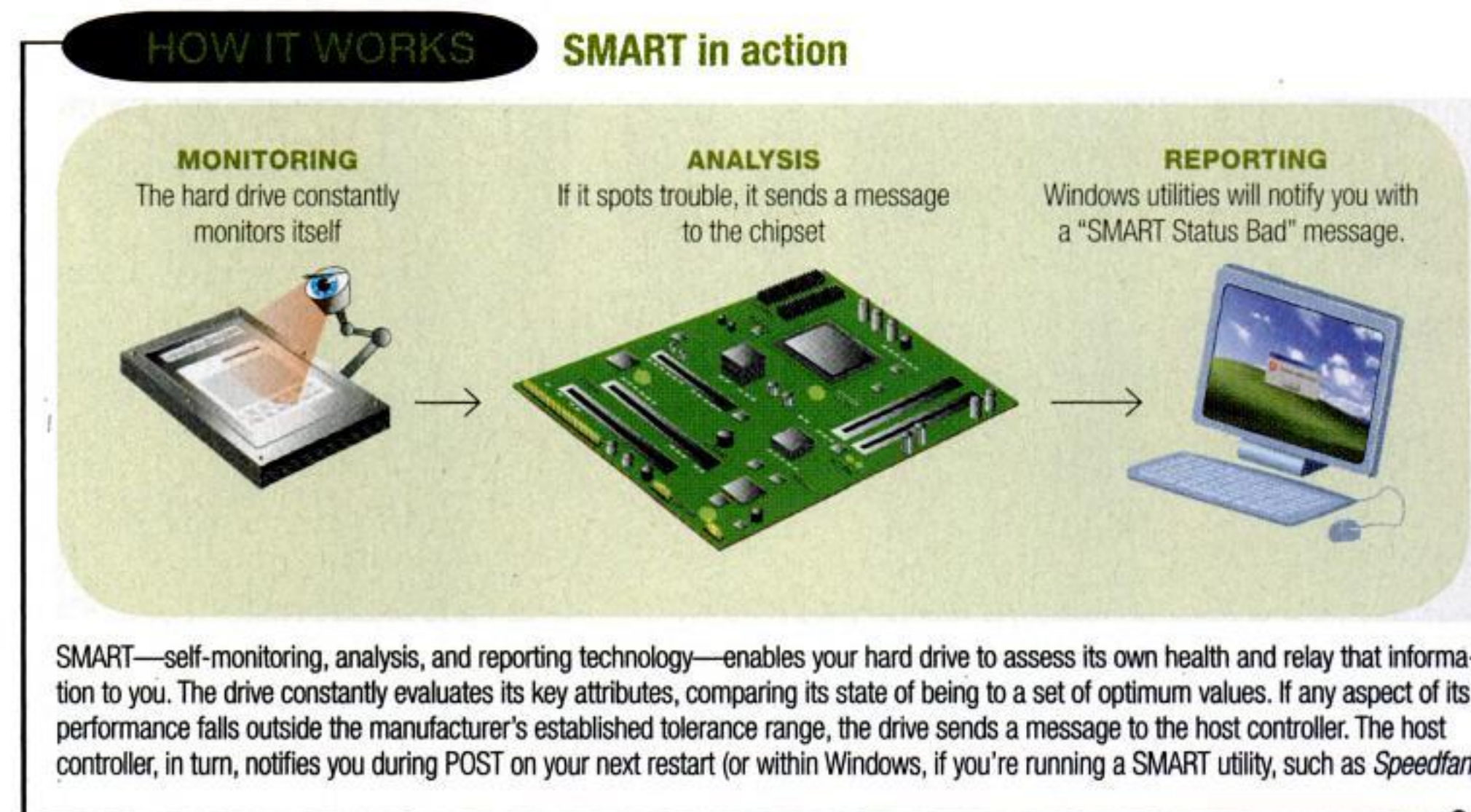
guaranteed a drive was headed toward that great trash can in the sky.

In many ways, SMART is like the oil trouble light on your car's dashboard. If your engine doesn't have enough oil to keep it lubricated, it will eventually seize up and destroy itself. This trouble light is connected to a device that monitors the oil pressure inside the engine. If the oil pressure drops below a predefined level, the trouble light will glow to alert you.

The only difference between that trouble light and the SMART sensor in your hard drive is the fact that you don't have to buy a new engine if the oil light comes on—you just need to add more oil. There's no such thing as a friendly SMART warning; if *any* of those thresholds are exceeded, your drive is dying and should be replaced. The fact that SMART attributes vary not only from one drive manufacturer to the next, but even from one drive model to the next, doesn't undercut SMART's value; nor does the fact that none of the drive manufacturers have agreed on a single definitive list of SMART attributes.

HOW IT WORKS

SMART continuously examines an operating hard drive, evaluating parameters such as how long it takes to spin up, the temperature of the drive, the precise distance between its read/write heads and its spinning platters, and more. If SMART determines that one of these conditions has exceeded the manufacturer's established threshold, it will imme-



SpeedFan 4.28

Readings | Clock | Info | **SMART** | Charts

Hard disk: HD0 - 400.1GB - WDC WD4000KD-00NAB0

Model: WDC WD4000KD-00NAB0 Firmware: 01.06A01

Perform an in-depth online analysis of this hard disk

Attribute	Value	Worst	Warn	Raw
Raw Read Error Rate	200	77	51	000000000000
Spin Up Time	225	219	21	000000001676
Start/Stop Count	100	100	40	0000000000C4
Reallocated Sector Count	199	199	140	00000000000C
Seek Error Rate	200	200	51	000000000000
Power On Hours Count	99	99	0	00000000047F
Spin Retry Count	8	7	51	000000001020
Calibration Retry Count	100	100	51	000000000000
Power Cycle Count	99	99	0	0000000004C0
Temperature	108	98	0	00000000002C
Reallocated Event Count	198	198	0	000000000002
Current Pending Sector	200	200	0	000000000000
Offline Correctable	200	200	0	000000000000
UltraATA CRC Error Rate	200	253	0	000000000000
Write Error Rate	200	200	51	000000000000

Fitness: Performance:

Coded by Alfredo Milani Comparetti - 2000-2006 - alfredo@almico.com

Monitoring a drive's SMART messages is just one of Speedfan's many uses. The red circle with the horizontal bar is SMART's way of saying that this drive has exceeded its Spin Retry Count threshold.

diately transmit a warning message to the host controller. A read/write head that has dropped a few nanometers out of spec, for example, is likely flying too close to the platter. SMART recognizes this to be an impending head crash, where the read/write head makes physical contact with the platter.

So how does your PC make you aware of such problems? The most common way is when you power up or restart your machine. Your computer will perform a power-on self test (POST), in which it will quickly examine all the components connected to the motherboard. When POST checks your hard drive, it will display a brief message that includes the drive's model number and its SMART status.

You can also check your drive's SMART status right from within Windows. You'll find a number of shareware utilities that can monitor a drive's SMART status; the freeware utility *Speedfan* is our personal favorite. This super-useful program's primary function is to control the speed at which your PC's various cooling fans spin—hence its name—but it can also access SMART readings for each of your hard drives. If you'd like to check the health of your hard drive, install and launch *Speedfan*. Click the program's SMART tab and look in the column titled "Attribute." Attributes with no icon next to them are just statistics; they don't have performance thresholds associated with them. Attributes with an OK in a green circle are operating within their established threshold. If you see a red circle next to any of them (see image above), consider yourself warned: Technology's grim reaper is sharpening his scythe. **MPC**

Hardware Autopsy

USB Flash Drive

Admit it: You use your USB key every day but have no real idea what's inside it or how it works. Here's the "inside" scoop.

ENCLOSURE

This ultra-sophisticated, plastic-alloy capsule shields the key's delicate internal components from the abuses of spilled beverages, car keys, and other items you carry in your pocket, and—most importantly—static electricity.

ASIC

The memory key's ASIC (application-specific integrated circuit) is the device's brain. This one is from an M-Systems unit and it consists of a 50MHz StrongARM 7 RISC processor. It handles all the read/write operations and performs four-bit error correction and bad-block scanning (to detect any flaws or corruption in the flash memory).

LED

Every USB key has a petite LED to indicate read/write activity; most, including this one, are blue.

NAND FLASH

These are the memory chips that store your data. This key uses 1GB of Samsung NAND flash memory. There are various types of flash memory available but NAND is one of the most popular and least expensive. In this type of memory, each cell holds one charged bit representing either a one or a zero.

PRINTED CIRCUIT BOARD

A memory key's integrated circuits and other components are soldered onto the printed circuit board. Manufacturers often design the PCB to accommodate more than one flash memory chip, so they can use the same PCB to make more than one model (a 512MB key and a 1GB key, for example).

Underside

CRYSTAL OSCILLATOR

This crystal generates the clock signal for the key's onboard processor. All the components onboard the PCB synchronize themselves to the frequency this crystal generates. Overclocking this oscillator would be a bad idea.

NEW!

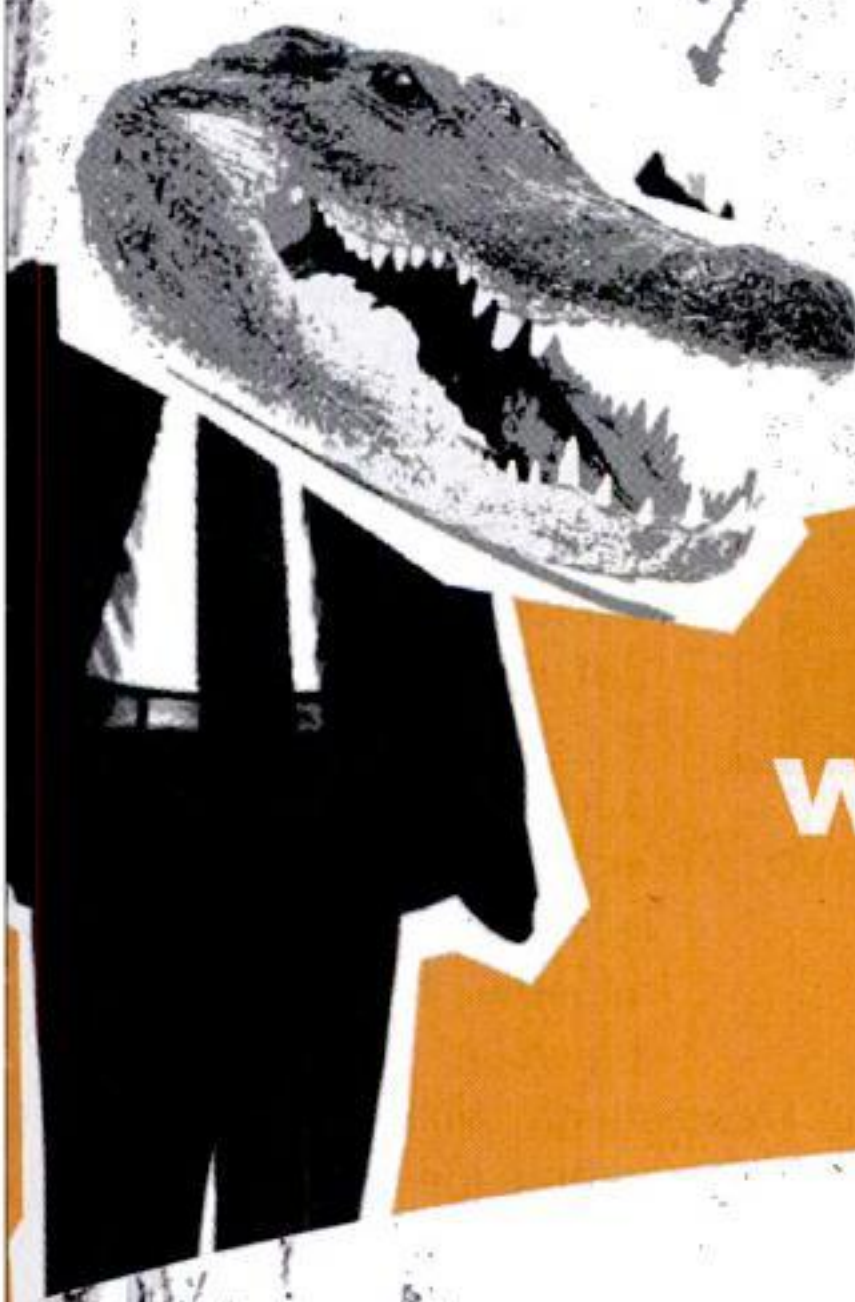
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FROM THE CREATORS OF

PC GAMER



PSM

GORDON MAH UNG

Kicks the Tires on Next-Gen Optical Discs



And discovers that the road to high-def movie content on the PC is fraught with DRM landmines

If you think getting high-definition (HD) content onto your PC is going to be as easy as adding a drive, installing the software player, and making a run to Best Buy, *fugetaboutit*. My experience building a Blu-ray-ready system tells me it's going to be a pain in the butt.

My HD journey actually started two ways: the first, an out-of-the-box solution in the form of an upgraded Toshiba Qosmio notebook. The G35-AV650 notebook is pretty much the same unit we reviewed in August, with the addition of the proper software and drive to play HD-DVD discs.

But knowing that there are many folks looking to add HD capability to their PCs, I also built a machine using Pioneer's groundbreaking BDR-101A drive (reviewed on page 82). With a beta version of Intervideo's Blu-ray-enabled playback software installed, I turned off the lights, grabbed the popcorn and was prepared to enjoy some high-def content. But after three seconds of playing, the Intervideo software abruptly stopped and flashed this message: "Your display environment does not support protected content playback." Why, it didn't say. Assuming that it was looking for an HDCP videocard, I swapped the GeForce 7800 GTX card for the HDCP-enabled GeForce 7950 GX2 card, grabbed the popcorn, and turned off the lights again.

Error again. Damn it. Hmmmm, was it the monitor? Thinking that Dell's new 24-incher wasn't HDCP-capable, I swapped the Dell panel for a 24-inch Viewsonic that I knew to have HDCP support, and bam—same error. OK, now what? We know that in any crime or computer error, if you put the driver in the lineup, he's the likely culprit. After downloading the latest beta driver from Nzone.com, I was finally in business—although after I spent all this time troubleshooting, the popcorn was stale.

But, still, all was not perfect. Using a 2.6GHz dual-core Athlon 64

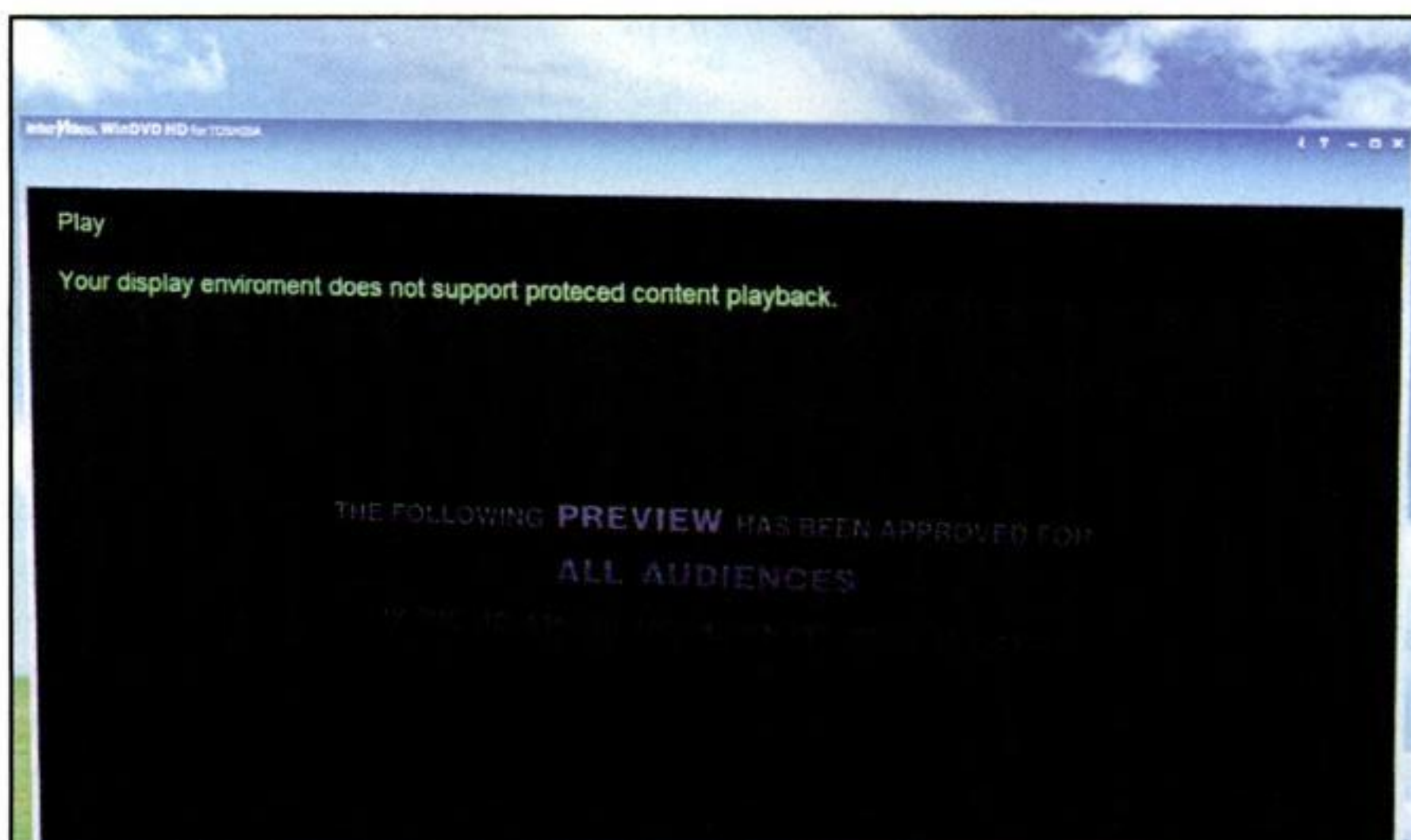
FX-60 and the 7950 card, we saw occasional stutters in playback. Performance issues were the least of our concerns, though, as we were thoroughly unimpressed by the output from the two movies we watched: *Crash* and *Terminator 2: Judgment Day*. Although quality was better than with the standard DVD versions, it just wasn't satisfying. It left me wondering what the problem was.

Was it poor encoding or intentional gimping by the studios, who are still frightened of HD? Or was it some mysterious configuration issue that caused the player to down-sample the image? Maybe you need an HDCP compliant keyboard and mouse? I finally settled on an explanation: MPEG-2 encoding. The majority of today's Blu-ray movies are encoded using MPEG-2, not H.264 or VC-1 (aka WMV9).

And just to show you how well thought-out the whole thing is: If you have a non-HDCP-capable monitor and you try to play a Blu-ray or HD-DVD movie using the DVI input, it won't

work. But use the analog connector on the monitor and videocard and it works fine. In the immortal words of Abraham Lincoln: WTF?

My experience with the Qosmio laptop was a little better—probably because the monitor is directly connected to the PC—but I still had concerns. I could output high-def video through the notebook's HDMI port to the Dell 24-inch monitor (which is indeed HDCP capable), but nothing would come out



No HD-DVD for you! Monitors without HDCP support won't work with HD-DVD content, even if you're running it through an HDMI cable.

of the notebook's analog port—at all. Interestingly, while the Blu-ray version of Intervideo's player isn't multithreaded, the HD-DVD version is. In a point for HD-DVD, my experience watching *Serenity* was far more satisfying (unfortunately we couldn't obtain the same movies in both Blu-ray and HD-DVD). On the Qosmio, the HD-DVD movie—encoded in VC-1—was more deserving of the term high-definition. Some portions, especially scenes with CG effects, looked stunning.

But HD-DVD land isn't all roses, either. We saw clear signs of color banding in playback, so something still isn't right. Even more entertaining was the half-assed print-screen protection. The Intervideo HD-DVD player won't play the video if it detects screen-capture software, such as *Fraps*, on your PC. But when we changed the name of *fraps.exe* to *poop.exe*, the player let us play movies and capture video at the same time.

Clearly, both HD formats are far from perfect. In an informal poll of our office, half the staff thinks both formats will fail, while the other half thinks multiformat readers/burners that play both Blu-ray and HD-DVD will eventually emerge. One thing is certain, though: You're better off waiting for the bugs, copy-protection problems, and format war to settle down before adding any next-gen optical drives to your PC.

How We Test

Real-world benchmarks. Real-world results

Computer performance used to be measured with synthetic tests that had little or no bearing on real-world performance. Even worse, when hardware vendors started tailoring their drivers for these synthetic tests, the performance in actual games and applications sometimes dropped.

At *Maximum PC*, our mantra for testing has always been "real world." We use tests that reflect tasks power users perform every single day. With that in mind, here are the six benchmarks we use to test every system we review.

SYSMARK2004 SE: This is an update of the *SYSMARK2004* benchmark, which uses a suite of such common applications as Microsoft *Word*, *Excel*, *PowerPoint*, Macromedia *Dreamweaver*, *Flash*, and *Winzip* to test general performance. It isn't heavy in multithreading, but it does feature multitasking tests.

Adobe Premiere Pro 2.0: We finally ditched our old standard-def *Premiere* test for one that uses high-def source material. The test is multithreaded, uses the GPU for transitions, and is brutal. It takes about an hour on our zero-point to render a short two minute, 46 second benchmark movie in the program.

Adobe Photoshop CS2: We start with a

RAW photo shot with a Canon EOS 20D, and apply a crapload of filters and other tasks from CS2 to see just how fast a rig can chew through the workload. Because we use every filter we can, the test is more fair and balanced than the usual cherry picking of *Photoshop* tests.

Ahead Nero Recode 2.0: *Nero Recode 2.0* is one of the fastest video-transcoding utilities. We copy unencrypted VOB files to the hard drive, then convert the movie to the Sony PSP's MPEG-4-based format. The program is heavily multithreaded, and shows marked performance increases on dual-core machines.

Quake 4: Based on the *Doom 3* engine, *Quake 4* is a popular OpenGL game. We run our test at 1600x1200 with 4x antialiasing and 4x anisotropic filtering. Generally, more robust OpenGL drivers yield better performance. We use a custom timedemo recorded using the 1.2 patch, which supports Hyper-Threading and dual-core processors.

FEAR: Monolith's *FEAR* is a cutting-edge DirectX game that pushes graphics hardware and systems to the limit. We run *FEAR* at 1600x1200 with soft shadows, physics, and audio acceleration enabled, and using the 1.03 patch.

Our monthly category-by-category list of our favorite products. New products are in red.

High-end videocards, dual-card config

XFX GeForce 7900 GTX
(model PV-T71F-YDD9)

High-end videocard, single-card config

eVGA e-GeForce 7950 GX2

Midrange videocard:

Sapphire Radeon X1900GT

Soundcard:

Creative Labs X-Fi Xtreme Music

Hard drive:

Seagate Barracuda 750GB 7200.10

External backup drive:

Western Digital Dual-Option Media Center 320GB

Portable USB drive:

Maxtor One Touch III 100GB
Ample storage, sexy formfactor, awesome software, and fast too!

DVD burner:

Plextor PX-716A

Widescreen LCD monitor:

Dell 2407FPW

Desktop LCD monitor:

NEC 90GX2

Socket AM2 Athlon 64 mobo:

Asus M2N32-SLI Deluxe Wireless Edition

Socket 775 Core 2 Duo mobo:

Asus P5W DH Deluxe
Driverless RAID and the reliable 975X chipset make this LGA775 board our pick—for now

Portable MP3 player:

Apple iPod

5.1 speakers:

M-Audio Studiophile LX4 5.1 (LX4 2.1 with 5.1 Expander System)

2.1 speakers:

M-Audio Studiophile LX4 2.1

Mid-tower case:

Thermaltake Armor Jr.

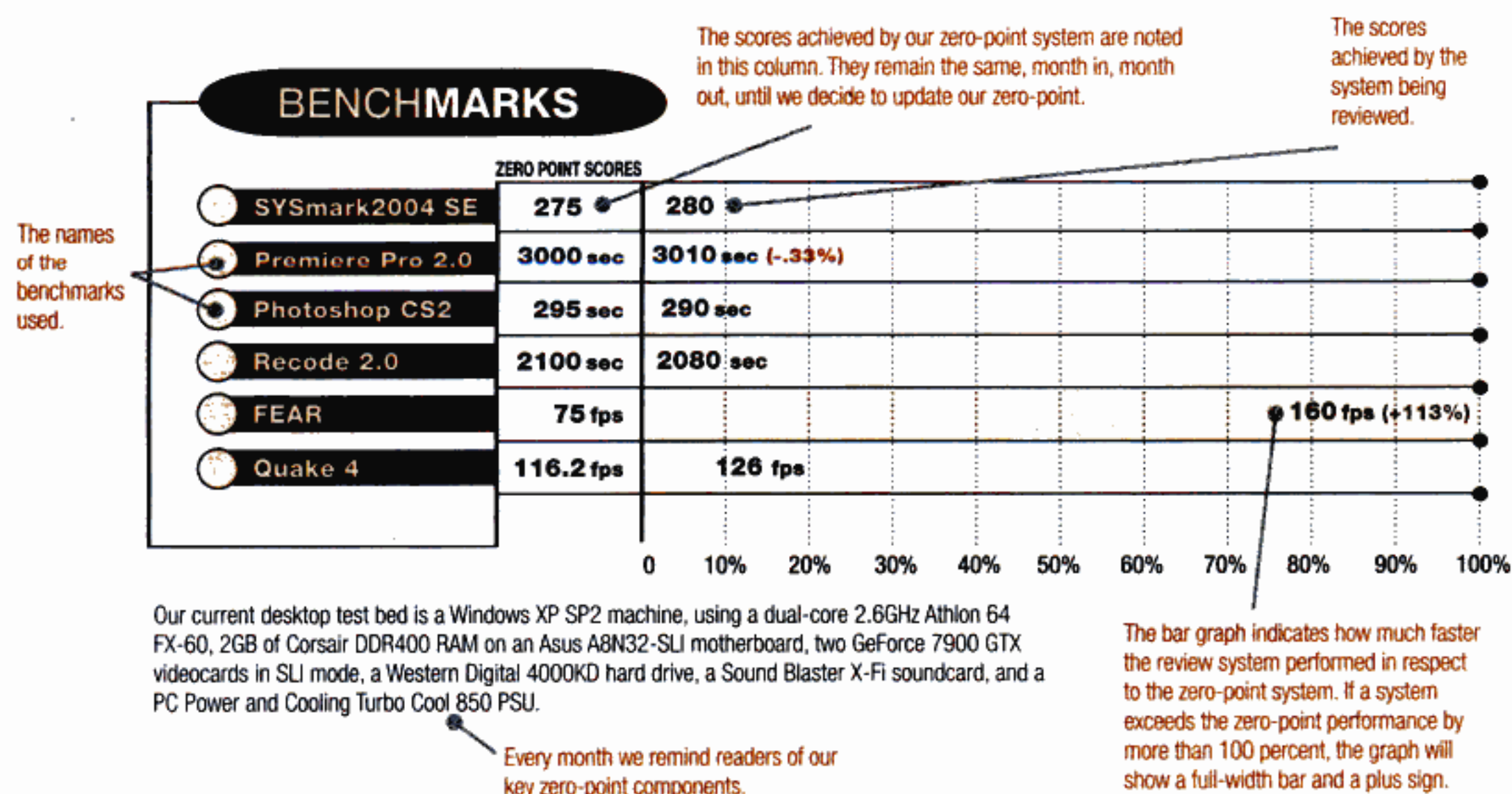
Full-tower case:

Silverstone TJ07

Games we are playing: *Prey*, *CivCity: Rome*, *Titan Quest*, *Battlefield 2: Armored Fury*, *Hitman: Blood Money*

How to Read Our Benchmark Chart

Maximum PC's test beds double as zero-point systems, against which all review systems are compared. Here's how to read our benchmark chart.



Falcon Northwest Mach V

This Core 2 Extreme machine takes a +5 Vorpall sword to the benchmarks

There's an annual event here at the magazine: We set performance records every September with the Dream Machine and before we can finish guzzling the celebratory beer, Falcon Northwest shows up to pee on our parade. And we're getting pretty sick of it. This time, the company gave our Dream Machine a good hosing with its new Mach V, which is

(sigh) the fastest PC we've ever seen—again. Damn it!

But what else would you expect of a machine featuring Intel's must-have Core 2 Extreme X6800 CPU? We know the chip over-clocks like nuts, but leave it to

the O.G. performance crew at Falcon to take this chip to the very heights of its performance. The stock X6800 clocks at 2.93GHz and in our Dream Machine, we hit 3.3GHz using air cooling. Falcon's Mach V makes it to a stable 3.73GHz using water. By stable,

we mean the machine never hiccupped during two days of benchmarking.

The build-out itself is top-notch. The Core 2 Extreme slots into an Asus P5N32-SLI mobo with 2GB of Corsair DDR2 RAM. We said no one would have the nForce 500-series chipset for Intel and we were right. There are apparently enough kinks in the new nForce that Falcon had to rely on its older nForce4 Intel Edition boards. Two slightly overclocked GeForce 7900 GTX cards in SLI handle graphics duties, and Falcon includes an Aegia PhysX accelerator instead of a Sound Blaster X-Fi card. Falcon says it normally leaves it up to the customer to choose components, but because we don't recommend configurations for review, the company chose the physics over sound. Our Falcon rep said that they'll be shipping systems holding both X-Fi and a PhysX cards soon, but they couldn't meet our deadline. That's too bad, because the price of the PhysX card is pretty hard to justify given the meager selection of titles available that support it. Does Falcon really think that someone spending \$8,400 on a rig will be playing *Bet on Soldier*? And the inclusion of the extraneous PhysX card really rankles us when we see the budget cuts made in crucial



The \$1,500 paint job will appeal most to the Society for Creative Anachronism folks who enjoy shouting "fire-ball" at each other.



Falcon apparently thought this review PC was headed for *Maxim*, not *Maximum PC*.

UNDER THE HOOD

BRAINS

CPU Intel Core 2 Extreme X6800 (2.93GHz@3.73GHz)

MOBO Asus P5N32-SLI (nForce 4 SLI Intel Edition)

RAM 2GB Corsair (two 1GB sticks)

LAN Dual Gigabit LAN

HARD DRIVES Two 150GB Raptors in RAID 0

OPTICAL Plextor PX-760A and Sony DDU-1615

BEAUTY

VIDEOCARD GeForce 7900 GTX in SLI (670MHz core, 820MHz RAM)

SOUNDCARD Onboard HD Audio

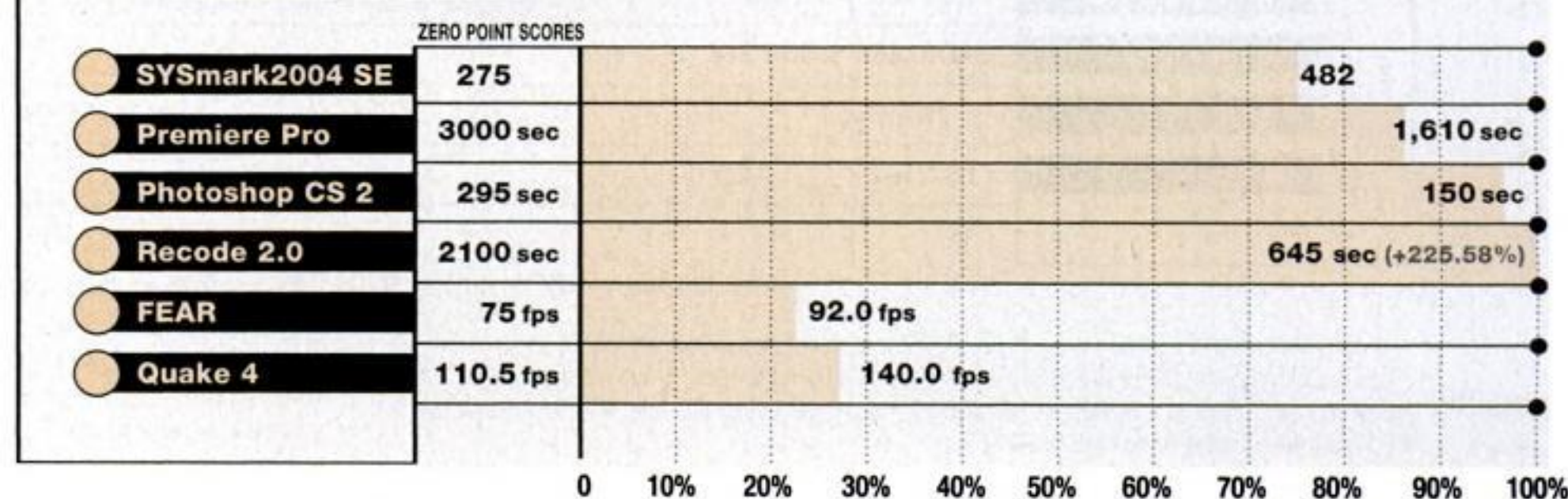
CASE Silverstone ICON

OTHER BFG Aegia Physix card, Sanyo-Denke water-cooling

BOOT: 51 sec.

DOWN: 8 sec.

BENCHMARKS



Our current desktop test bed is a Windows XP SP2 machine, using a dual-core 2.6GHz Athlon 64 FX-60, 2GB of Corsair DDR400 RAM on an Asus A8N32-SLI motherboard, two GeForce 7900 GTX videocards in SLI mode, a Western Digital 4000KD hard drive, a Sound Blaster X-Fi soundcard, and a PC Power and Cooling Turbo Cool 850 PSU.



FNA, this FNW box is fast, despite the temporary ghetto-fabulous north bridge fan.

stock setup. Then we ran a second cable between the spare PATA port and the DVD-ROM drive and re-ran the test. The difference? Just one minute. Although we do think the second drive should be on its own port (one IDE port was free), we can't fault Falcon because the performance difference was insignificant.

So what does 3.73GHz of Core 2 Extreme power give you? Boatloads of performance, that's what. We keep a spreadsheet of performance scores posted in the Lab, with the record scores in bold. For the Mach V, we opened the spreadsheet, input that PC's scores, then dutifully unbolded the Dream Machine's scores—the Mach V set the high mark in four out of our six benchmarks.

Compared with the Athlon 64, it's as ugly as you'd expect. The Mach V ran fully 46 percent faster in *Nero Recode 2.0* than the fastest Athlon 64 FX box. In *Premiere Pro*, the Mach V is 53 percent faster, in *SYSmark2004*, 58 percent faster, and in our *Photoshop CS2* test, it has a 61 percent advantage. Again, this is against the fastest Athlon 64 FX machines we've reviewed. They were among the fastest PCs on Earth until the Mach V hit the scene.

The only scores the Mach V didn't steal were in gaming, which is more dependent on the GPUs' overclock. Dream Machine still holds the record for *Quake 4*—it beat the Mach V by a whopping 5fps.

The Mach V isn't perfect, but it sure is

close. We'd like a little more storage and discrete sound, but we'd happily give that up for a production PC that sends an entire schoolyard full of Athlon 64 machines crying to mommy.

—GORDON MAH UNG

FALCON NORTHWEST MACH V

+ SPEED
So fast it makes Pentium 4 and Athlon 64 machines look like they're running in reverse.

- GREED
Why the skimpy storage? Why the PhysX card?



\$8,395 (\$6,895 w/o paint job), www.falcon-nw.com

Digital Storm Twister Ultra 4

Knife at a gunfight? Athlon 64 can't handle the heat

When we looked at Digital Storm's Twister Ultra 4, we thought of it as Every Dude's Machine. You know, it's just how the average person would build it. There's no fancy-pants paint or custom wiring. But there is a gratuitous use of drive bay doodads like an LED screen, removable hard drive adapter, and Creative Labs Live drive. The upshot? The already-macho-looking Cooler Master CM Stacker case looks even more, well, macho. Yup, this rig will make you hitch up your pants, snort, and say, "Oh yeah, this is just how I'd build it—none of that sissy stuff!"

That's not to say the machine's fit and finish isn't impressive.



The Twister Ultra 4 is more beast than beauty.

The water-cooling on the CPU and dual GeForce 7900 GTX cards is top-of-the-line. Because 350-plus watts of heat must be wicked out of the case, Digital Storm thought a single small radiator wasn't sufficient for the dual-video-card/CPU combination. So Digital Storm cleverly put one radiator on the case's rear and somehow magically plumbed a second radiator to vent out the top of the case. It's a neat job except for one thing: Not all of the hoses are secured with hose clamps, so they could pop off at any moment. They're on fairly tight, but unsecured hoses around \$6,500 worth of hardware makes us *nn-nnn-nervous*. We're also annoyed that the fans attached to the two radiators run super-loud. We'd expect a dual-radiator setup

to run at a quieter speed.

In the hard drive category, the Twister Ultra includes four 150GB Raptors in RAID 0. A single Seagate 750GB Barracuda gives you enough space to back up all the data on the RAID array, and sits in an easy-to-remove drive rack. The overclocked 7900 GTX cards let you run any game on the market with aplomb. But the Twister Ultra 4's processor is a weakness. Yesterday, the Athlon 64 FX-62 was hot, and today it's simply not. Digital Storm couldn't secure an Intel Core 2 Extreme CPU by our deadline. (Note that Falcon Northwest, reviewed on page 78, was faced with the same deadline but managed to secure the powerful Intel chip.)

In the end, an FX-62—even one running at 3GHz—is like bringing a Tribble to a Klingon house party. You know it's going to end up as garnish on an order of stewed gagh. The Twister Ultra ran so slow compared with Falcon's Mach 4 that we weren't even sure it was plugged into the wall.

The good news is that the Twister Ultra 4 compares well to our Athlon 64 FX-60 zero-point system, chalking up scores between 28 and 14 percent faster than the 2.6GHz FX-60. The bad news is that Digital Storm reached a little far with this rig's GPUs. The machine came with its cards running at a 683MHz core and 876MHz DDR RAM but could not complete *Quake 4* until we cranked the cards down halfway to the stock clocks. Even at 667/850, however, there were signs of corruption, and successive runs of *Quake 4* got progressively slower. After three runs, we were



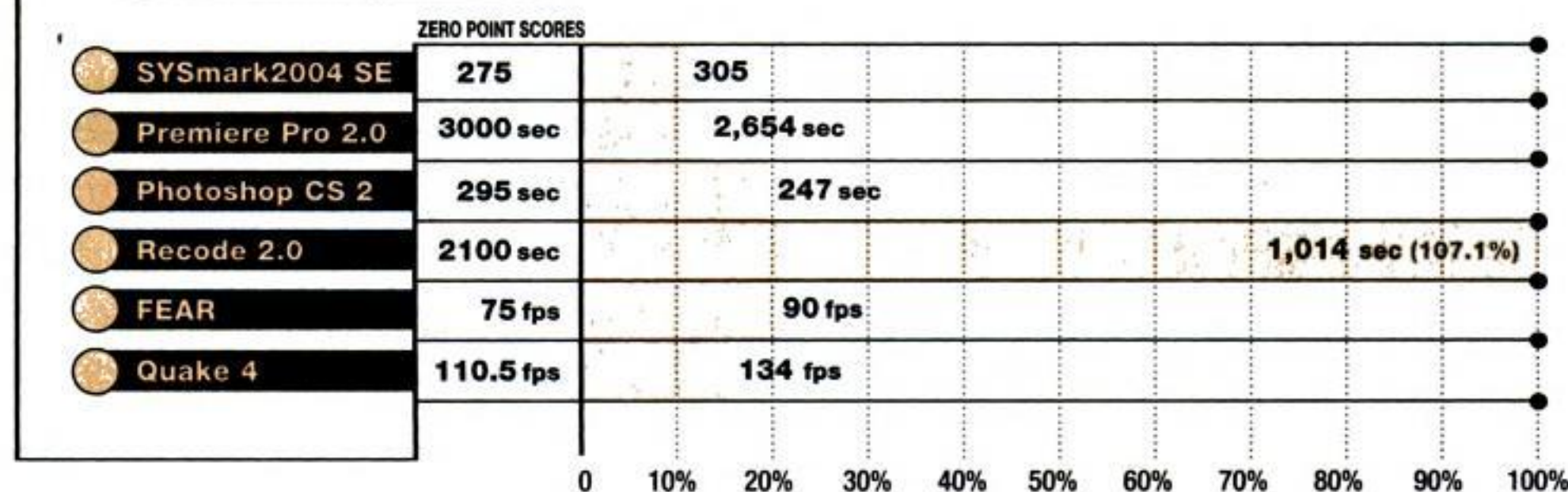
Ultimately, the inclusion of the underpowered Athlon 64 FX-62 leaves the Twister Ultra limp.

down to 85fps. Not good, especially considering the water-cooling on these cards. Oh, by the way, none of the machine's four front-mounted USB ports were plugged in.

We've seen Digital Storm machines in the past and they've been competent. Not this time. Up against the heavily overclocked Core 2 Extreme in the Falcon Northwest machine, and given its puny Athlon 64 and two glitchy, overclocked GPUs, this review can only end in tears.

—GORDON MAH UNG

BENCHMARKS



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UNDER THE HOOD

BRAINS	
CPU	AMD Athlon 64 FX-62 (2.8GHz dual core@3GHz)
MOBO	Asus M2N32-SLI (nForce4 590 SLI)
RAM	2GB Corsair (two 1GB sticks)
LAN	Dual Gigabit LAN
HARD DRIVES	Four 150GB WD Raptors in RAID 0 and one 750GB Seagate Barracuda
OPTICAL	Plextor PX-760A, Sony DDU-1615
BEAUTY	
VIDEOCARD	Two GeForce 7900 GTX in SLI (683MHz/876MHz)
SOUNDCARD	Sound Blaster X-Fi Fatal1ty
CASE	Cooler Master CM Stacker 830
BOOT: 47 sec. DOWN: 9 sec.	

DIGITAL STORM TWISTER ULTRA 4

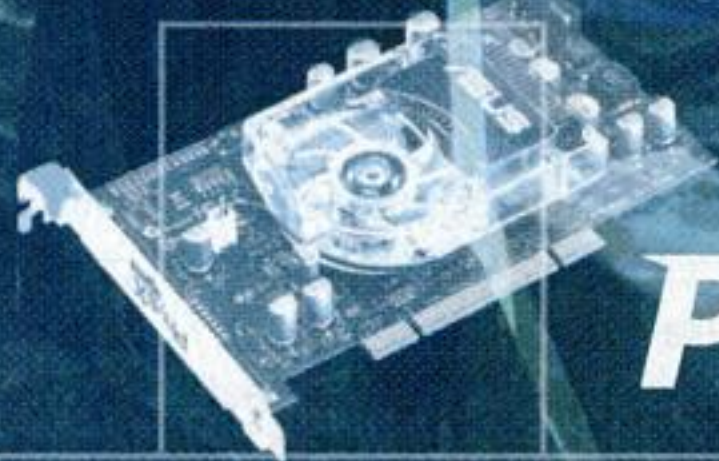
- BILL PAXTON**
Trick water-cooling and a RAID array could have made the Twister a mean machine.
- BILL SHATNER**
Noisy acoustics, overly overclocked videocards, and last month's CPU.



\$6,510, www.digitalstormonline.com

ATOM CLANCY'S
**GHOST
RECON**
ADVANCED WARFIGHTER
-Now Bundled with PysX P1!

Believe



PhysX P1

Reality gaming is a matter of PhysX. Calculating how energy and matter interact at the particle level more than 500,000 times per second, the ASUS PhysX card provides you with a gaming environment that doesn't just look real – it acts real. Explosions, collisions, fire, smoke, and movement are all suddenly believable. Making the gaming experience suddenly – unbelievable_

ASUS®

usa.asus.com/maxpc/physx

MICRO CENTER
The Computer Store

mwave.com

FRY'S
ELECTRONICS

newegg.com

ZipZomfly.com

TigerDirect.com

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Pioneer BD-R 101A Blu-ray Drive

Good for burning 25GB discs, and that's about it

Blu-ray has finally arrived, and like a lot of first-gen products, it's big on price, but not so big on performance. Sure, we used it in the Dream Machine last month, and we stand by that decision. The Dream Machine is all about the bleeding-edge—it boasted a beta BIOS, a beta chipset, and a Blu-ray drive too, damn it, despite the fact that Blu-ray movies and blank media are incredibly scarce.

Now that we're back in the real world, however, it's time for a sober assessment of Blu-ray technology. Does it work? Yes. Can it really burn 25GB onto a disc? Yes—though in reality, the burned discs actually contain about 22.5GB, due to the whole “how many bytes are in a megabyte?” problem. And finally, the big question: Is Blu-ray worth the cost? The answer is, to put it bluntly, *hell no*.

BENCHMARKS

	PIONEER BD-R	SONY 16X DVD
DVD WRITE SPEED AVERAGE	6.2x	11.20x
DVD READ SPEED AVERAGE	6.1x	12.07x
4.25GB DVD DATA BURN	10:41 (min:sec)	6:08 (min:sec)
22.5GB BLU-RAY DATA BURN	45:18 (min:sec)	N/A
ACCESS TIME (RANDOM/FULL)	146ms/328ms	120ms/190ms
CPU UTILIZATION	6% (2x)	22% (8x)

Let's look at the reasons to pass on this drive.

The most obvious is cost. At \$1,000 the BD-R 101A costs more than a decent PC—an



The first Blu-ray drive has arrived in the Lab! Sadly, it arrives with a low-speed whimper instead of a bang.

insane price for an optical drive. Second, it's not very fast, for burning either Blu-ray recordable (BD-R) or DVD-R. It burns DVDs at just 8x, and burns Blu-ray at 2x—which translates into a pokey 9MB per second. The drive's slow speed makes it very quiet, but it takes a whopping 45 minutes and 18 seconds to burn a 22.5GB disc.

It gets worse. The BD-R 101A can't read or write to CD, which is a massive oversight from the perspective of gamers and music lovers. Furthermore, the drive doesn't come with software to watch Blu-ray movies, and there isn't any third-party player software available at this time. Pioneer ships a bare-bones version of *Roxio* with the drive, which lets you burn data discs, but that's about it. The dearth of software is even more surprising given this drive's outrageous price.

For mere mortals, this drive simply isn't worth the money. When speeds ramp up and media and movies are more readily available, it'll be a more attractive prospect. For now, it's nothing more than a novelty.

—JOSH NOREM

PIONEER BD-R
\$1,000, www.pioneerelectronics.com

4

Fujifilm FinePix V10

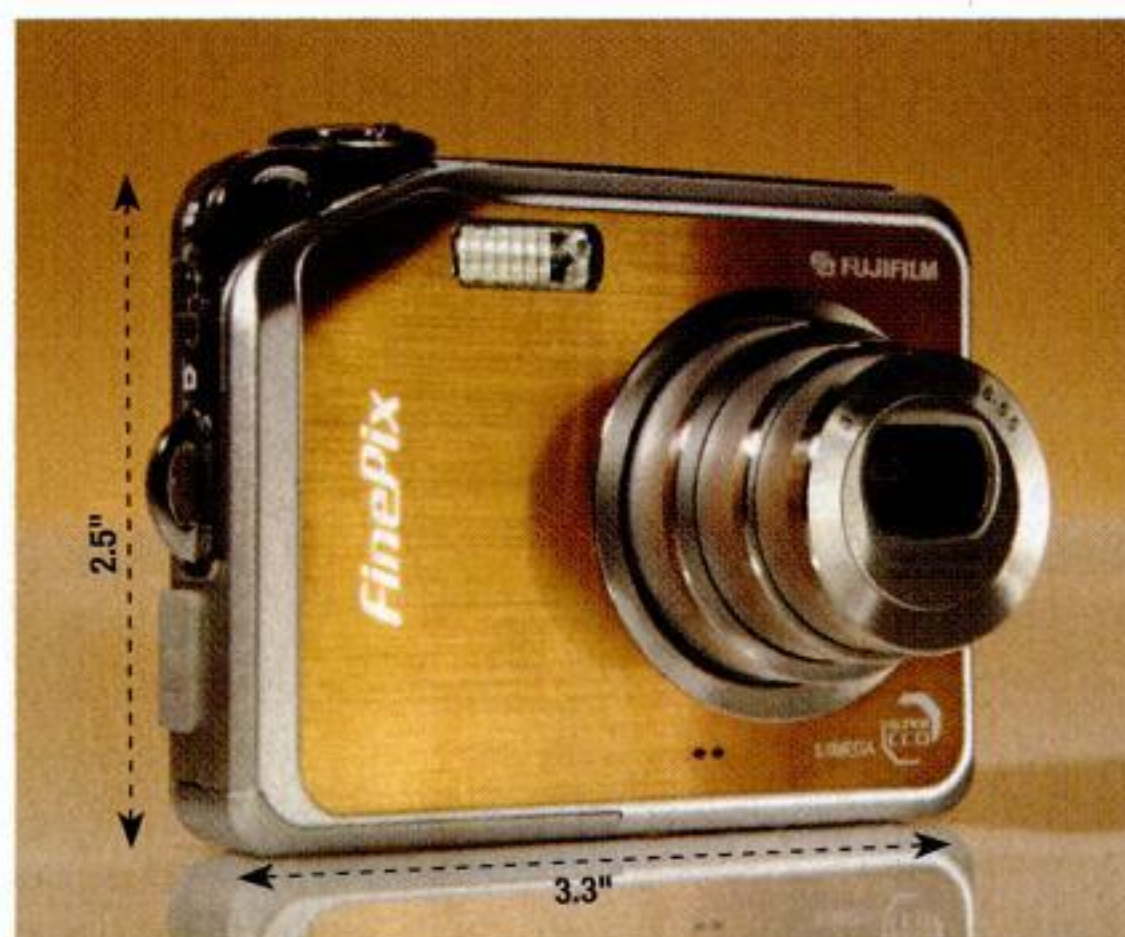
Don't judge this camera by its games

Are digital cameras now headed in the direction of “smartphones”? You've gotta wonder when you hear about a point-and-shoot camera that plays games—what's next, a camera that makes phone calls?

OK, we jest, but if you spent some time with Fujifilm's FinePix V10, you wouldn't blame us. As a camera, this is a very capable, very user-friendly, very stylish, compact point-and-shooter. It takes nice 5.1 megapixel photos at ISO speeds up to 1600, thanks to its aggressive, and effective, noise-reduction capabilities (though, you'll still be happiest with images shot at 400 ISO and below). Its large 3-inch LCD is bright, sharp, and *almost* makes up for the absence of a traditional viewfinder. The LCD real estate is put to good use, offering a 30-thumbnail display and a useful Post Shot Assist mode that shows the last three snaps alongside the live viewfinder window. The camera gains up nicely in low-light situations but can still be problematic in bright sunlight.

The V10's a relatively snappy performer, too, with shot-to-shot intervals of less than 2 seconds; plus it offers several burst-mode options, and its 10-step, 3.4x optical zoom lens is smooth, quick, and quiet. The only real glaring chink in the V10's shiny armor is its lackluster battery life—ours needed a recharge before we hit 100 shots. This is no doubt due to the fancy-pants LCD, and the games, which, quite frankly, are a gimmick.

The camera sports four titles: *Number Puzzle*, *Block Buster*, *Maze*, and



The V10's claim to fame is a huge, vibrant LCD display that's put to very good use—cheesy games aside.

Shooting Game (yes, those are the real names.) All of them are more frustrating than fun to play using the camera's controls, which thankfully are excellent for the V10's true calling—picture-taking.

Photogs can safely ignore the games and focus on the camera's manual controls, which allow you to quickly and easily perform exposure compensation and white balance tweaks. And the V10 includes a healthy stable of scene presets, covering just about every imaginable shooting condition from nighttime to sports.

The games might be disposable, but the V10's capabilities are very worthy of consideration—just make sure you also consider an extra battery, or two.

—STEVE KLETT

FUJIFILM FINEPIX V10
\$400, www.fujifilmusa.com

8

It's all about you.

The music you need.

The room you love.

The sound you require.



SoundBridge is a network music player that plays your Mac or PC music library and Internet radio in any room of the house, connecting your stereo or powered speakers to the music you love via Wi-Fi or Ethernet.

SoundBridge Radio is a simple, high-performance compact system that's ready for the digital world. You get unsurpassed stereo sound, Wi-Fi music streaming, Internet radio, AM/FM radio, dual alarms with volume ramp, auto-dimming vacuum fluorescent display, and 18 presets that make it a snap to access your favorite stations, playlists or any music search you desire.

Wireless Internet radio and music streaming from Roku

Roku's SoundBridge products are compatible with iTunes®* and Windows® Media Connect music player software, Rhapsody™, Musicmatch™, and any PlaysForSure™ music service such as Napster, MSN Music and Walmart.com.

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ROKU

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Asus P5W DH Deluxe

Conroe cometh via Intel's 975X chipset

Oh, how the world turns. Last month you marched past the Intel 975X chipset motherboards holding your nose, but with the release of the Core 2 Duo and Core 2 Extreme CPUs you've made a U-turn to give this chipset a second look.

Well, you better take a good look at Asus' P5W DH Deluxe, which could be the ultimate 975X board, with its handy remote, driverless RAID, and onboard Wi-Fi. Our favorite feature of the P5W DH Deluxe, though, is the simple fact that it works with the Core 2 Duo and Extreme CPUs. Many older boards that still litter store shelves and inventories don't support the Core 2's lower voltage requirements.

On Intel's D975XBX motherboard, for example, only those with "AA" codes that end in 304 work with Core 2s out of the box. Asus' original version of the 975X board, the P5WD2-E, didn't work with Core 2s, but newer versions do. Unfortunately, the majority of web stores don't differentiate between new and old boards. You avoid the incompatibility pitfall by purchasing a board that universally supports Core 2, such as the P5W DH.

But the differences aren't just in CPU support. The P5W DH Deluxe adds a mix of new tricks to the 975X chipset, such as the aforementioned remote, which lets you turn your PC on or off.

Asus went plumb crazy with the storage options: The board includes Intel's Matrix RAID-ready ICH7R south bridge and the integrated JMicron controller (which lets you create RAID 0 or 1 using an internal SATA drive and an external eSATA drive). We're not sure what exactly you'd use an internal/external RAID array for, but the chip also supports non-RAID options, and it gives you a valuable second PATA port.

BENCHMARKS

	SCORE
3DMark2001 SE	43,505
QUAKE III	705
PC MARK 2005 MEM	5,428
HD TACH 3.0	56.6MB/s

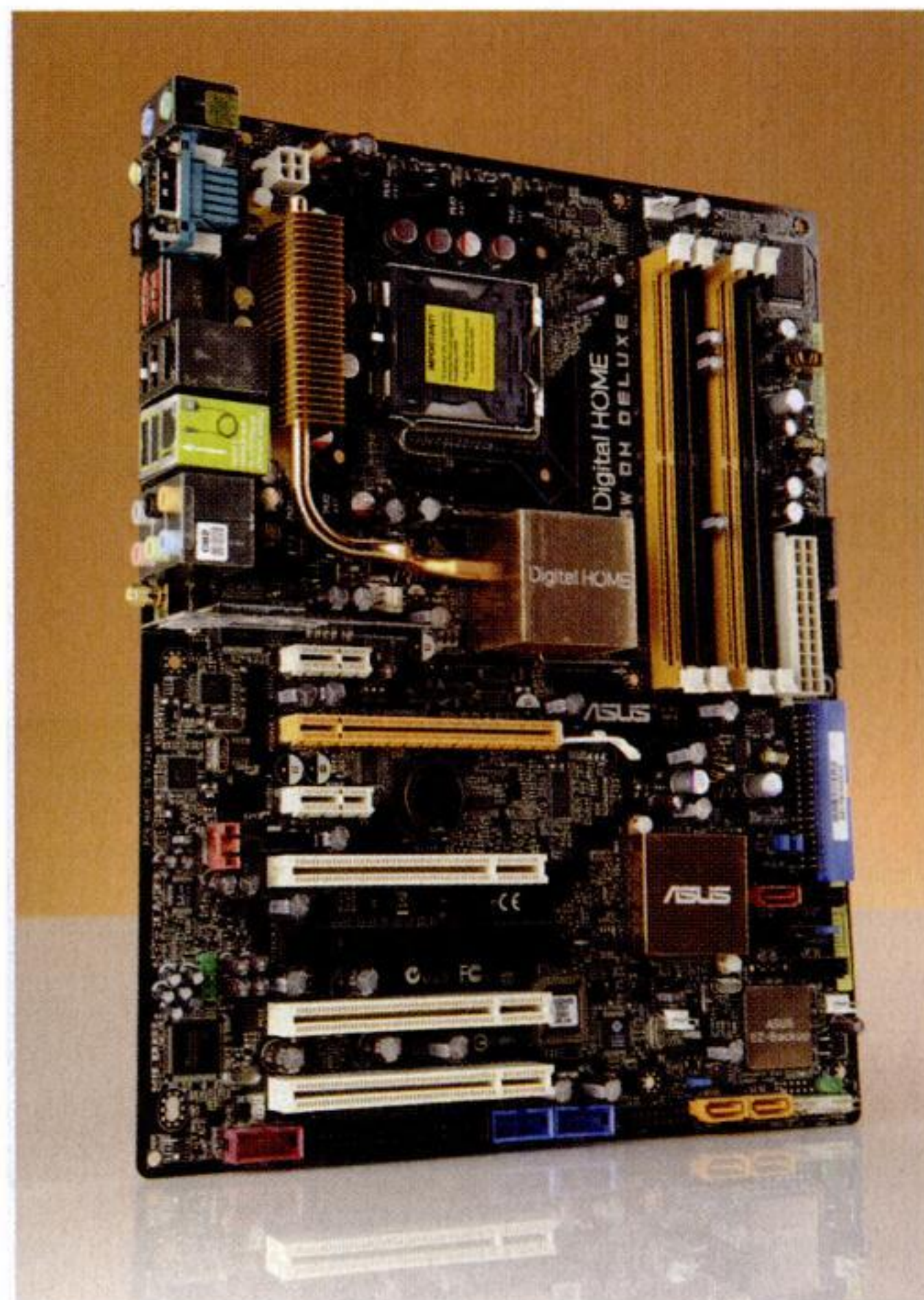
We tested with a 2.66GHz Core 2 Duo E6700, a GeForce 7900 GTX, a Western Digital WD4000KD SATA hard drive, 2GB of Corsair DDR2/800, Windows XP SP2, and a PC Power and Cooling Turbo-Cool 1KW.

Even more interesting is the Silicon Image 4723 controller chip, which supports driverless RAID 0, RAID 1, and JBOD. Just set the mode via jumpers on the board and start installing your OS—you don't even need to install F6 drivers! By default, you're given RAID 1, which Asus calls "EZ Backup." As a safety feature, the board won't change RAID modes even if you change the jumpers by accident, until you approve it in the BIOS. We recently learned the value of driverless RAID when we tried to recover a file from a corrupted RAID 0 system. A driverless RAID mode would have saved us hours of work.

The expansion-slot layout is PCI friendly. If you run two dual-slot CrossFire cards (nVidia doesn't allow SLI on the Intel chipset), you can still run two PCI cards. This is great for today's hardware, but what if the graphics-card manufacturer's plans to use a third PCI-E graphics card for physics pans out? You're out of luck with the P5W DH's config. Another ding is more against the chipset. When running two graphics cards in CrossFire mode, the board limits both cards to x8 modes. In today's games, the bandwidth gap shouldn't make much difference, but why not support dual x16s? Bueller? Intel? Anyone?

The board includes Asus' excellent over-clocking capability (we took our 2.66GHz proc to 3.2GHz without breaking a sweat) and tons of BIOS options.

We have a hard time quantifying the performance of the board because it's the first production Core 2 board we've reviewed. We ran a few benchmarks with the 2.66GHz Core 2 Duo E6700 and, golly, the new Intel chip still kicks ass. If we could just get SLI support, everything would be perfect. Unfortunately, that's apparently out of the hands of Asus and Intel.



It's hard to imagine what else Asus could have added to the P5W DH Deluxe board.

SPECS

CPU SUPPORT	Pentium 4, Pentium 4 Extreme Edition, Pentium Extreme Edition, Pentium D, Core 2 Duo, Core 2 Extreme
FSB SUPPORT	800MHz, 1066MHz
RAM	8GB DDR2 553/667/800
SOCKET	LGA775
CHIPSET	975X w/ ICH7R
AUDIO	HD Audio using RealTek ALC882M
LAN	Marvell 88E8053 dual Gigabit, 802.11b/g
STORAGE	7 SATA, 2 PATA

ASUS P5W DH DELUXE

+ M240B
Core 2 Duo and Extreme support, up to 8GB of RAM, and driverless RAID!

- M60
Where's the dual x16 PCI-E? Damn, this thing is expensive!



—GORDON MAH UNG

\$280, www.asus.com



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The Quick-Wireless Quandary

Draft-N: Good investment or nonstandard nonsense?

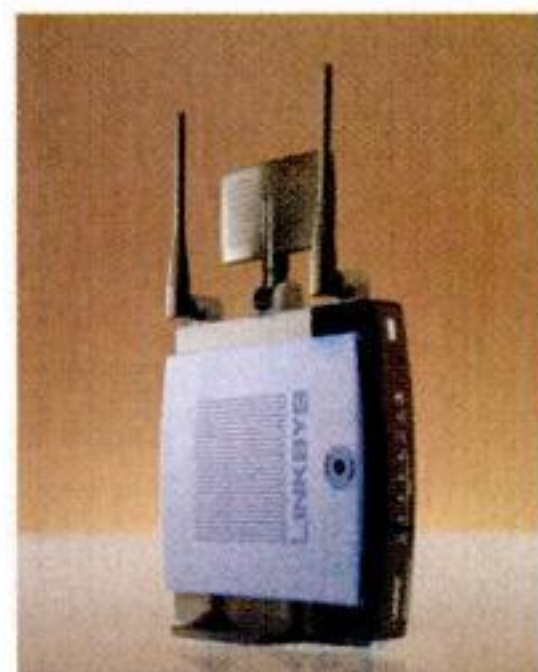
Standards: Can't live with 'em; can't live without 'em. That seems to be the wireless networking industry's collective opinion of IEEE 802.11n, the influx proposed standard that promises to deliver wireless speeds of 300Mb/s.

It's a dilemma for us all. As tech enthusiasts, we crave speed and power; but as consumers, we demand reasonable prices and compatibility across brands. Can standards deliver high price-to-performance ratios, or does conformity stifle innovation? We're retaining our faith in the former, for now; but the IEEE better get its act together and agree on a genuine 802.11n standard soon.

—MICHAEL BROWN

LINKSYS WIRELESS-N WRT300N VER. 1

If you insist that your high-tech gear look the part, you'll dig the paddle-shaped antenna on Linksys' WRT300N Ver. 1. In terms of performance, though, we found it to be more effective at swatting flies than delivering the promised 300Mb/s networking.



Linksys' Wireless-N WRT300N looks like a prop for a sci-fi movie, but its performance makes it more appropriate for slap-stick comedy.

You'll notice that we took the trouble to mention we reviewed Version 1.0 of the WRT300N. That's because the router we reviewed is based on Broadcom's Intensi-Fi chipset; Version 2.0 (which is not marketed in the U.S.) is based

on Atheros' XSPAN. It's worth noting that the Buffalo NFinity Draft-N wireless router that so disappointed us last month also uses Intensi-Fi; but because we changed our benchmarking tool and methodology in the interim, you shouldn't compare the two products' benchmarks directly. (We'll post a four-way comparison at MaximumPC.com).

on Atheros' XSPAN.

Having said that, Linksys' Wireless-N gets shredded in a head-to-head contest with Netgear's WNR854T (reviewed below)—especially at distance. At close range (within five feet), Netgear's router was 21 percent faster. That advantage grew to nearly 50 percent at moderate range (25 feet away, with four gypsum walls in between), and it exploded to 371 percent when we moved to our outdoor patio (75 feet from the access point). Bottom line: an underwhelming effort from Linksys.

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LINKSYS WRT300N V. 1

- + VENUS FLYTRAP**
Off-the-geek-scale formfactor.
- FLY PAPER**
Unimpressive throughput, especially at range.

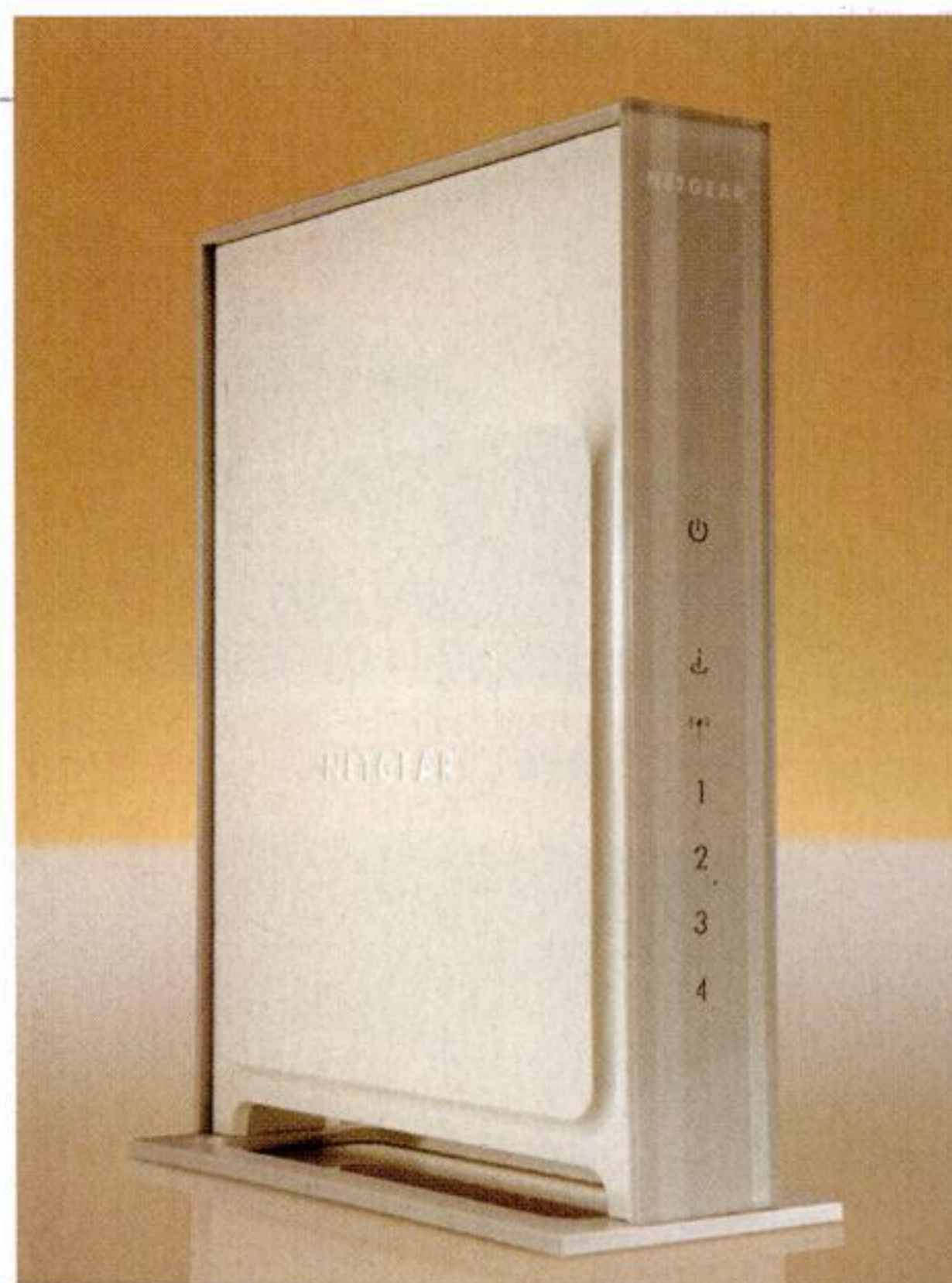
5

\$130, www.linksys.com

NETGEAR RANGE-MAX NEXT WNR854T

Netgear's WNR854T commands a \$10 premium over Linksys' WRT300N, a cost that's easily justified by the former products' features and performance.

Let's tackle performance first. Netgear's router looks so sharp that we were skeptical its concealed antennae could deliver throughput and range. And while it's light-years away from delivering its promised 300Mb/s throughput, it approached



Faced with these two wireless routers, we'd pay the \$10 premium for the Netgear WNR854T's faster throughput and gigabit switch any day of the week.

wired Ethernet speed with TCP throughput of 91.2Mb/s at close range, and 78.5Mb/s at moderate range. Throughput dropped to 16.0Mb/s during our long-range test, but that's supersonic compared with the Linksys' measly 3.4Mb/s at the same distance.

You'll see slower throughput if you integrate either of these new routers into an environment with wireless gear that supports only WEP encryption. But where the Marvell TopDog chip in Netgear's router delivers acceptable performance (70.9Mb/s at moderate range), the Broadcom part in the Linksys chokes, wringing out just 2.9Mb/s of throughput at the same range.

Turning back to features, the WNR854T is the first draft-N product we've seen to incorporate a four-port gigabit Ethernet switch into the box; everyone else seems to be sticking with an old-fashioned 100Mb/s switch. And if your PC doesn't have a gigabit network adapter now, you can bet your next one will.

NETGEAR WNR854T

- + PITCHER PLANT**
High throughput; gigabit switch; good looks.
- INSECTICIDE**
Questionable interoperability, due to absence of an IEEE 802.11n standard.

8

\$140, www.linksys.com

BENCHMARKS

	LINKSYS WRT300N	NETGEAR WNR854T
TCP THROUGHPUT IN ENVIRONMENT 1 (Mb/s)	75.3	91.2
TCP THROUGHPUT IN ENVIRONMENT 2 (Mb/s)	52.8	78.5
TCP THROUGHPUT IN ENVIRONMENT 3 (Mb/s)	3.4	16.0

Best scores are bolded. Encrypted TCP throughput (WPA2 PSK AES) measured using Iperf 2.02.

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Samsung HD400LJ

Get 400 gigs on the cheap

Even though Seagate's behemoth 750GB Barracuda is getting all the love from the media these days, most people can't afford a drive that spacious. The sweet spot is still at 300-400GB drives, but even those prices fluctuate. Enter the SpinPoint HD400LJ—a drive that offers both ample room and extreme affordability.

Although it sports a measly (by today's standards) 8MB buffer, the 400GB SpinPoint ran amazingly fast in our sequential read speed test, besting nearly every 7,200rpm drive we've ever tested. Its read speed of 61MB/s outpaces

even the mighty WD4000KD, running neck-and-neck with that drive's big brother, the WD5000KS. The SpinPoint is not as fast as the 750GB Seagate Barracuda, but that's not surprising—*nothing* is as fast as the big, bad 'Cuda.

Aside from its stellar performance in the sequential read test, however, the SpinPoint delivered lackluster results in the rest of our benchmark suite. Its seek time of 15.4ms is surprisingly off-spec, and this helped it limp to a substandard score of 26.4 in our application index. The



We were surprised by Samsung's SpinPoint. It's competitive with offerings from WD and Seagate, and insanely affordable.

BENCHMARKS

	SAMSUNG
HD TACH 3	
RANDOM ACCESS TIME (MS)	15.4
BURST RATE (MB/S)	183
AVG. SEQUENTIAL READ (MB/S)	61.3
OTHER	
DOOM 3 LOADING (SEC)	31
5GB READ (SEC)	105
IOMETER 50 PERCENT RANDOM WORKLOAD (IO/SEC)	154
OPERATING TEMP WITH NO FAN**	55

Best scores are bolded. *The application index is a real-world script of six applications. The score is based on the time it takes the drive to complete the scripts. **Hard drive temperatures measured using S.M.A.R.T. data, as reported by the Speedfan utility.

drive also scored poorly in our *IOMeter* test, but performed decently in real-world file-transfer tests.

Yes, the SpinPoint's performance falls short of first place, but it's not a terrible drive—and it has a few noteworthy things going for it. First, look at the price below (go ahead, we'll wait). Can you believe it? We searched our favorite price comparison engines, and couldn't find a less expensive 7,200rpm 400GB drive, anywhere. It's also one of the quietest drives we've ever tested. Even during seeks it's barely audible, and it makes no noise at all while idling.

In the final tally, the SpinPoint drive is a compromise. It delivers respectable performance and decent capacity, but it's no match for today's high-end 7,200rpm drives. While we'd never choose this drive over a faster performer, it's great for folks on a budget. We just wonder what Samsung could do if it paired this drive with a 16MB buffer.

—JOSH NOREM

SAMSUNG SPINPOINT

\$150, www.samsung.com

8

Creative Zen V Plus 1GB

You want small? We'll give you small

We've seen Lilliputian MP3 players before, but Creative has taken the concept a step further with the Zen V Plus: This change-purse-size device boasts a vivid 1.5-inch OLED screen for viewing photos and videos.

Besides its dimensions, we think this device's most interesting feature is its user interface: Creative has finally come up with something that's as simple as the one on Apple's iPod. The company dumped the twitchy touchpad used in its larger devices in favor of a tiny joystick. You navigate the user interface by pushing the joystick up and down to scroll, and left and right to drill into nested items. Clicking down on the joystick selects the chosen menu item. To back out of any menu or activity, you simply squeeze the button with an arrow pointing left. The remaining button on the face toggles between play and pause.

If we didn't know better, we'd swear the video screens on the iPod and on Creative's Zen Vision: M develop scratches from dust mites crawling across their surfaces, so we assumed a video device designed to fit in your pants pocket would have the same lifespan as one of those microscopic bugs. To our surprise, the Zen V Plus has yet to develop a single scar, despite being jamming into our jeans alongside car keys and spare change several times a day for three weeks straight. Creative coats the entire device with an extremely tough polymer that seems impervious to scratches.

Photos looks pretty good on the OLED, but video frame rates are slow



Creative stuffs this incredibly small package with a photo and video viewer, a Plays For Sure-compatible MP3 player/recorder, an FM radio, an OLED screen, and 1GB of flash memory (2- and 4GB models also available).

and jerky; we definitely wouldn't want to watch a movie on such a tiny screen. Audio quality was inferior to that of full-size players, but not bad. And Creative's *Zen Media Explorer* software renders the device quite useful for transporting and

synchronizing media files, documents, and *Outlook* data (contact database, calendar, task lists, and so on) between PCs. We'd never rely on this device as our sole media player, but we're finding that the more we use it, the more we like it.

—MICHAEL BROWN

CREATIVE ZEN V PLUS

\$200, www.creative.com

8

Maximum Effect for a minimal price

A6Jc series notebooks

are powered by Intel® Centrino® Duo Mobile Technology, increasing graphics performance by up to 30%



NVIDIA® GeForce® 7300 supports 256 Megabytes of TurboCache video memory for the latest graphics-intensive games.



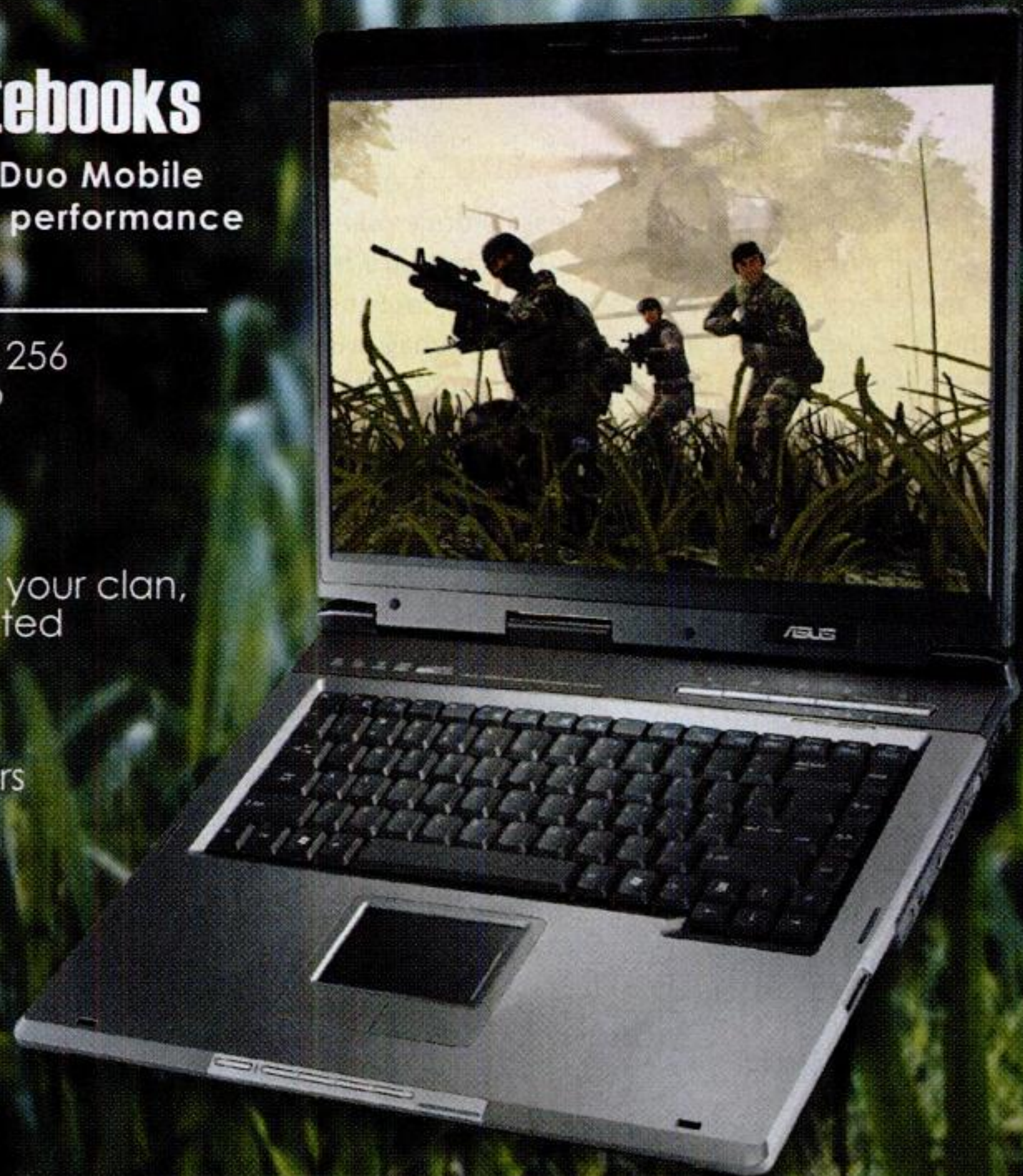
Coordinate the next attack with your clan, via built-in webcam and integrated microphone.



8 Cell battery allows up to 4 hours of continued gametime.



MSRP \$1299.



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**Dual-core.
Do more.**

Case Cage Fight

Two cases go mano a mano

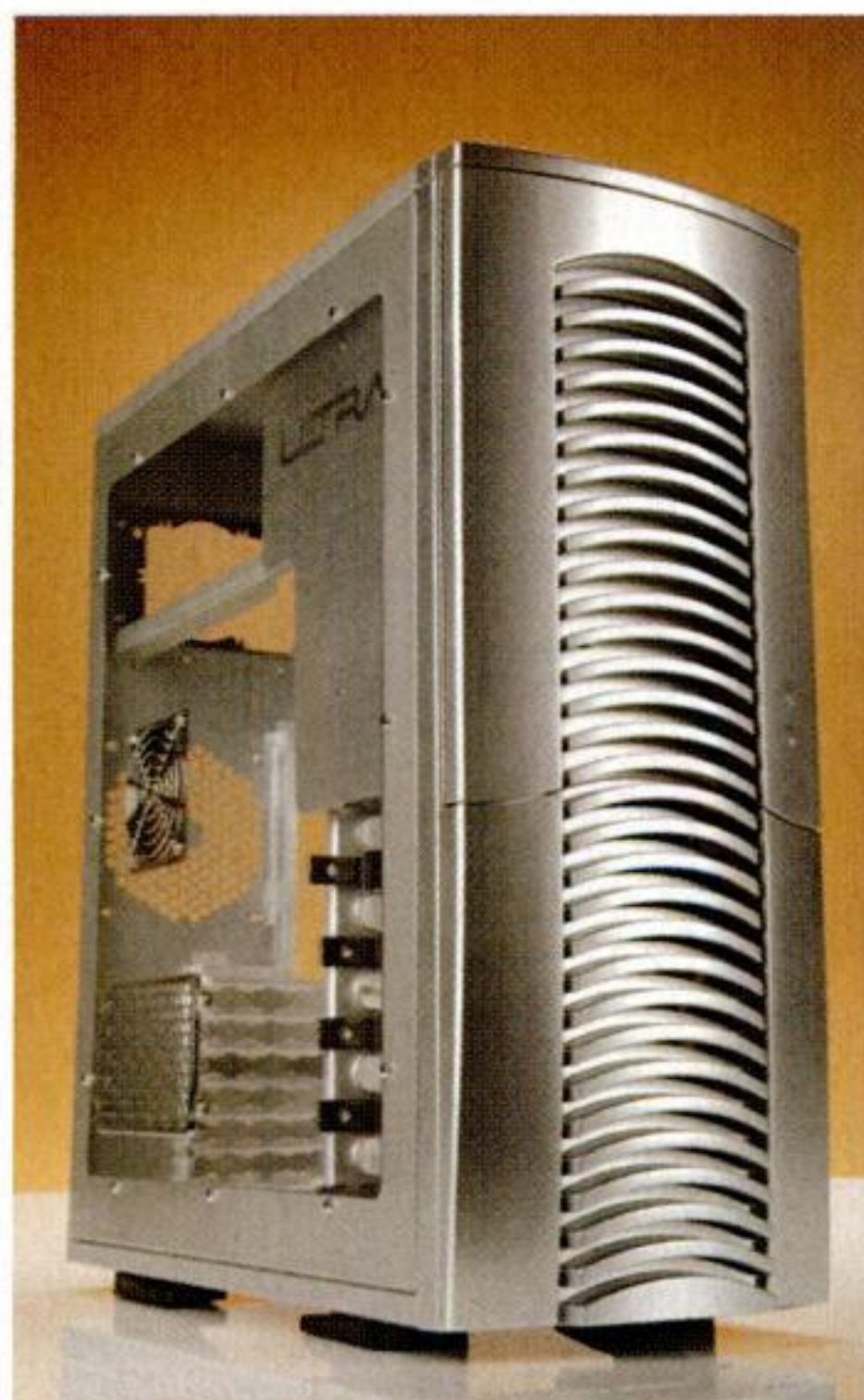
If those high-end Silverstone and Lian-Li cases are country clubs for the rich and famous, these cases are the bowling alleys for the rest of us party animals. Most folks can't afford to drop \$250 on an enclosure, even if it will last a good three or four years. Here are a couple cases that are quiet and good looking, but that won't burn a hole in your pocket.

—TODD HASELTON

TUNIQ 2

The Tuniq 2 comes with a bunch of accessories: a CPU air duct, a plastic VGA fan insert, and three fans. In our tests, everything but the fans proved worthless.

Tuniq says the Grand Air Duct is for "excellent cooling and performance," and that the VGA fan is meant to "successfully solve the VGA-card overheating problem." While the concepts seem interesting and original, neither of these features worked with our slightly larger than average Thermaltake Mini Typhoon water-cooling kit. Tuniq suggested we remove the Grand Air Duct so we could at least use the VGA fan, but that wasn't possible

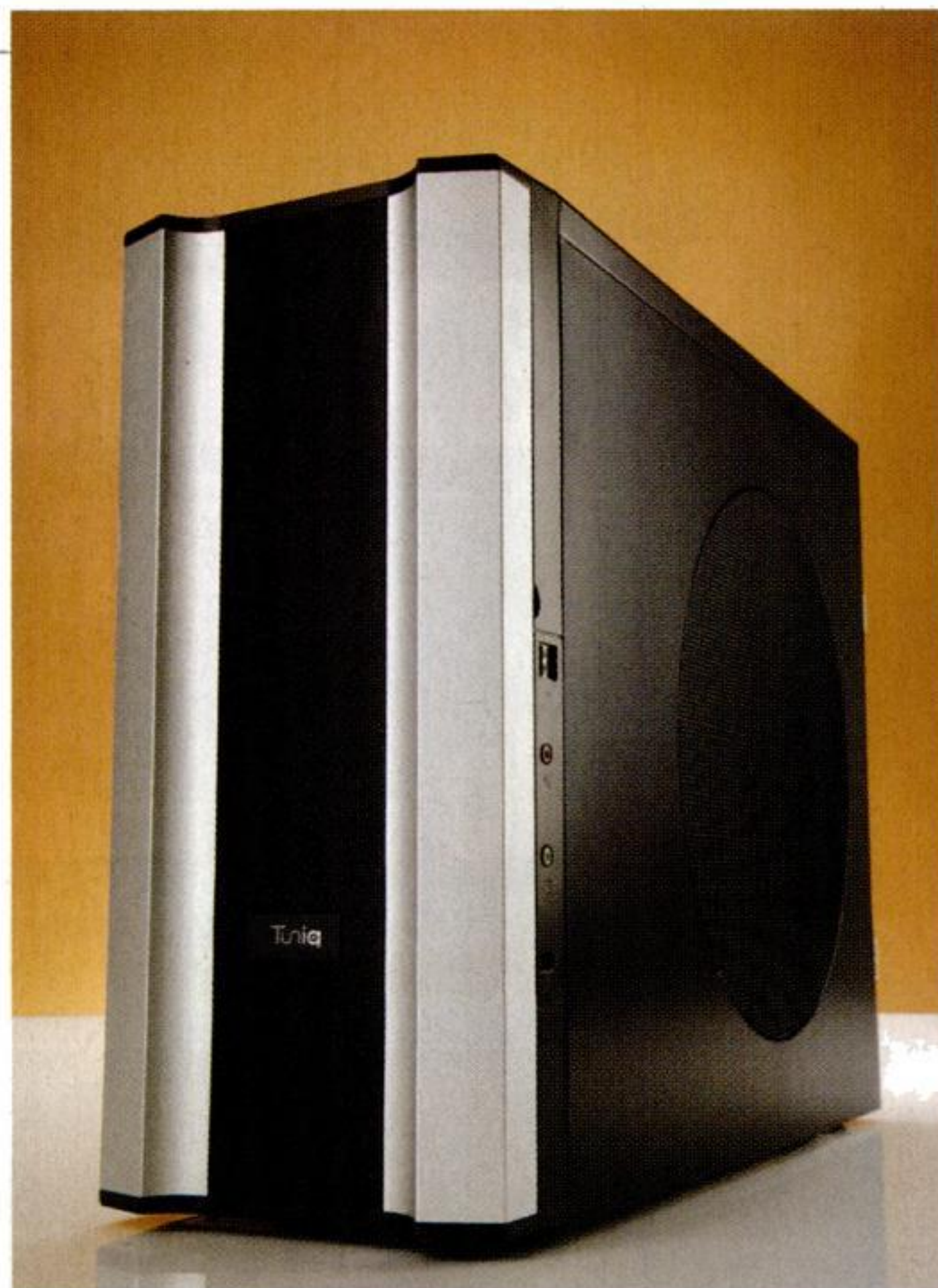


This Ultra Aluminum case is so light we could have thrown it a mile, but our doctors wouldn't let us.

either. Tuniq also touts the case's "unique upside-down chassis layout;" but we were annoyed that we had to turn the case upside-down just to screw in the hard drives.

Working inside the Tuniq is like working inside every other budget enclosure: no drive rails and no motherboard tray. The video-card installation was a snap with the Tuniq's screw-less expansion card setup.

The Tuniq 2 is attractive and comes with three fans, but if you want more than the basics, look elsewhere.



Don't buy an aftermarket cooler if you want to use the Tuniq 2's accessories.

TUNIQ 2

+ GRAND MASTER

Three fans included; easy installation; quiet.

6

- BAND MASTER

Advertised accessories didn't work with our setup; heavy.

\$75, www.tuniq.com

ULTRA ALUMINUS

The Aluminus is one of the lightest cases we've ever lifted—honestly, it's like holding an empty beer can.

The case is large and spacious, so parts installation is easy. We just screwed our motherboard to the tray and then secured the tray to our case with thumb screws. Hard drive and optical drive installation was also a breeze, thanks to the included drive rails. The power supply, however, could have been easier; we had to unscrew a crossbar just to get it in.

The Ultra has room for two 12cm intake/exhaust fans, but we're baffled as to why the fans themselves are not included. Many case makers add the parts, especially at this price. The case

has an attractive glossed-metal exterior—until you see the front, that is. The case's face has a door with a bunch of gills covering the drive bays, which looks too retro for our tastes; a solid front would have made the case much more attractive.

Like the Tuniq 2, the Aluminus comes with an air vent over the expansion slots as well as a CPU air duct, which also didn't work with our aftermarket Thermaltake Mini Typhoon. But even without these accoutrements, the case's spacious interior promotes airflow and it stays quiet—even with our own fans installed.

The Aluminus is light as a butterfly, but its useless accessories and lack of fans, stings like a bee.

ULTRA ALUMINUS

+ SPLINTER

Light; quiet; easy installation.

8

- SHREDDER

No fans included; air duct is useless for aftermarket coolers.

\$150, ultraproducts.com

MOBILE COMMAND GAMING LAPTOP SWEEPSTAKES

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PRIZES

Grand Prize (1)

One Grand Prize Winner will receive one (1) Dell® XPS M1710 loaded with Intel® Core™ Duo Processor from THQ (approximate retail value \$2,500) plus a copy of Company of Heroes™ game (approximate retail value \$50).

Second Prize (4)

Four Second Prize Winners will each receive one (1) EVGA NVIDIA® GeForce™ 7800 GS graphics card from THQ (approximate retail value \$350) plus a copy of Company of Heroes™ game (approximate retail value \$50).

Third Prize (1)

One Third Prize Winner will each receive one (1) Logitech Z-5500 Digital Speakers (approximate retail value \$275), one (1) Logitech G-15 Gaming Keyboard (approximate retail value \$75), and one (1) Logitech G5 Gaming Mouse from THQ (approximate retail value \$50) plus a copy of Company of Heroes™ game (approximate retail value \$50).

Fourth Prize (1)

One Fourth Prize Winner will each receive one (1) Motorola SLVR L7 Phone (approximate retail value \$200) plus a copy of Company of Heroes™ game (approximate retail value \$50).

Fifth Prize (10)

Ten Fifth Prize Winners will each receive one (1) Company of Heroes™ game (approximate retail value \$50).

Official Rules

No purchase necessary. Some restrictions may apply.

Go to www.maximumpc.com/cohsweepstakes for the official rules.

For more information on Company of Heroes™ visit <http://www.companyofheroesgame.com>.

EVGA



Blood and Gore
Intense Violence
Strong Language



www.thq.com

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The very latest in intimate apparel for your ears

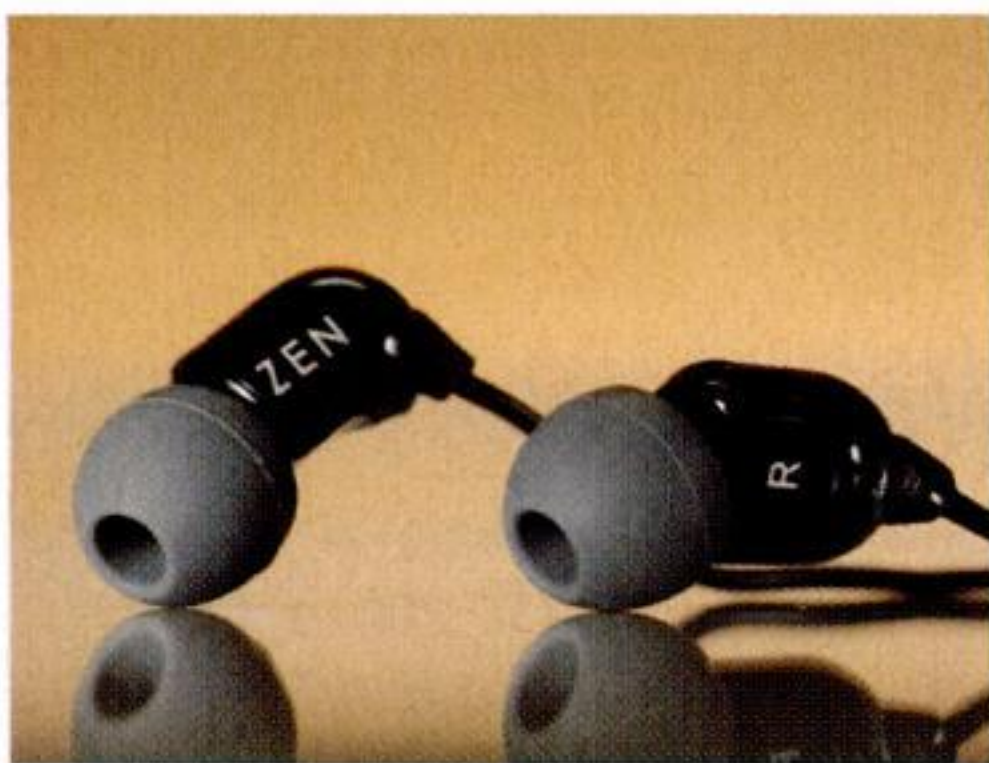
We recall our mother's admonishment every time we shoved a set of earbuds into our head: "Don't stick that in your ear, you don't know where it's been!" There's nothing quite like listening to music through such wee headphones; but if you're still relying on whatever el cheapos came bundled with your favorite player, you're probably not getting your money's worth.

—MICHAEL BROWN

CREATIVE ZEN AURVANA

Creative has pulled together a very nice audio package here. The Aurvana's are a terrific-sounding set of headphones that deliver crisp, well-defined audio across the sonic spectrum.

They deliver very good balance—no instrument is emphasized at the expense

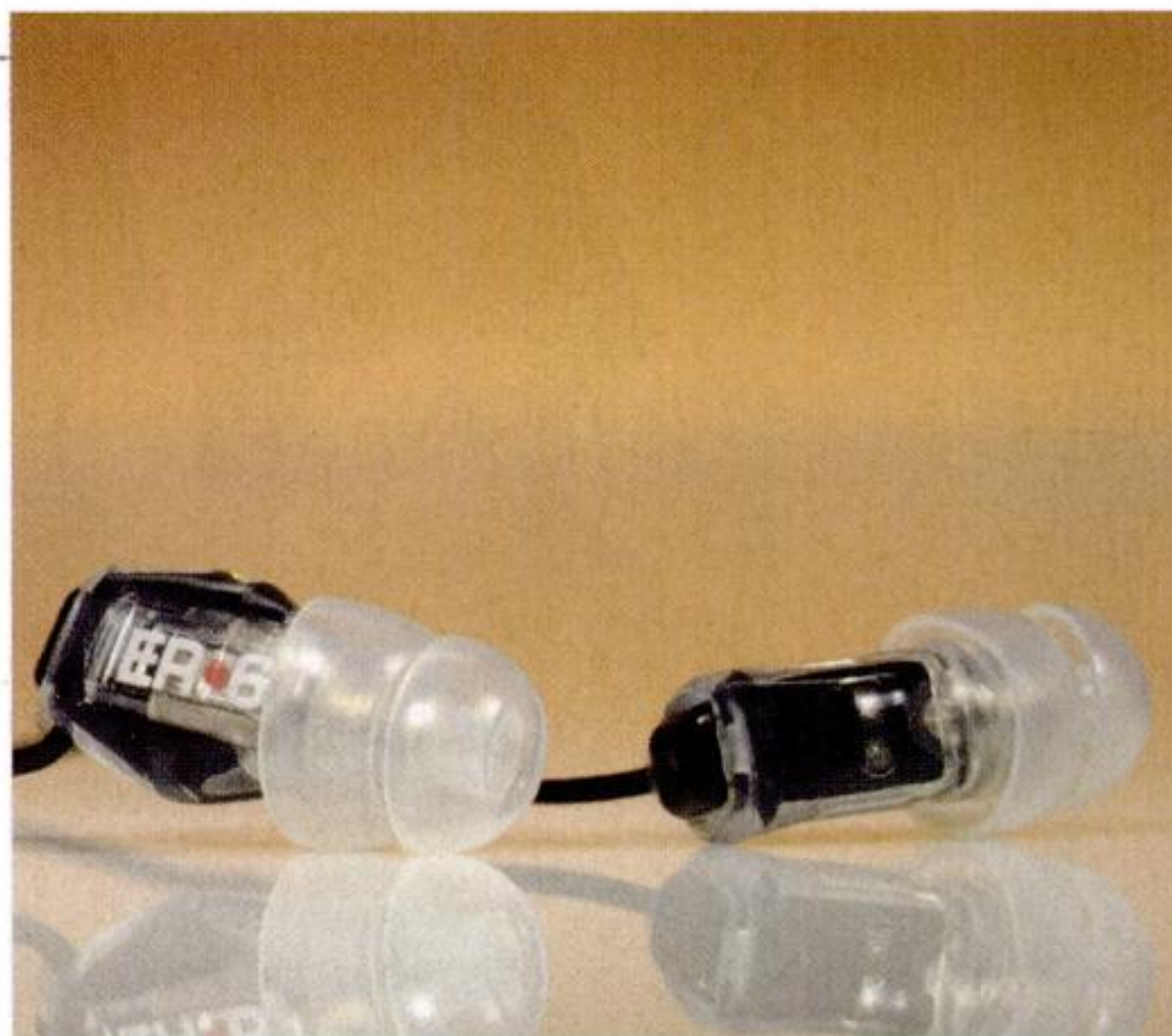


We really like Creative's Zen Aurvana earbuds, but their bass response is a tad shy of a Kick Ass rating.

of another. We dug how Walter Becker's intricate guitar work sounded on Steely Dan's "Jack of Speed" as it floated over that studio band's incredible rhythm section. And we heard many acoustic elements that we'd previously missed in Beck's "Nicotine & Gravy;" but when that song's bass becomes one of its defining elements, it reveals one of the Aurvana's few weaknesses: The bass tends toward muddiness when it gets hot and heavy.

Creative provides six pairs of silicon plugs for the Aurvana, but only three sizes. Do they think buyers will share the earphones, swapping out plugs? Eew! Whatever the case may be, we had no

Etymotic's ER-6 Isolators deliver fantastic sound and noise isolation; it's a shame there's not a wider variety of fit options.



trouble finding a pair that was comfortable for our smallish ear canals—and they did a very good job of blocking ambient noise. Creative was the only company thoughtful enough to provide an adapter for plugging into airline sound systems, and they earn kudos for their hard-shell carrying case—the best-designed of the bunch.

ETYMOTIC ER-6 ISOLATOR

The relentless snare drum crack on "Jack of Speed" was enough to make some of the lesser earbuds beg for mercy, but the Etymotic ER-6 Isolators delivered it nearly perfectly. More importantly, they served up Beck's bass with equal authority.

But if you decide to give these buds a shot, make sure the store has a satisfaction-guaranteed policy: Etymotic bundles just two sets of plugs with them. The silicon tips fit us well and did an outstanding job of preventing fan noise and other audio detritus from intruding on our consciousness, but we couldn't stuff the foam ones in our ears with a jackhammer. This two-sizes-fits-all policy is a let-down for a \$140 product, as is the absence of a carrying case (unless you consider the reusable plastic container to be a case).

Etymotic was also the only manufacturer that didn't provide a cleaning tool with its

product; a replaceable filter is included, instead. When the filter becomes sufficiently clogged with ear gunk—double eww!—to impact the earphone's performance, you pull it out, throw it away, and snap in a new one. We're guessing that the process is at least slightly less disgusting than reaming out the earphone itself.

EXTREMEMAC FS1

It's been our experience that you get what you pay for, more often than not. The ExtremeMac FS1 earbuds, however, fall into the "not" territory. The \$150 for-sale sign hanging on these little buggers easily qualifies them as the most expensive earphones of the group, but they certainly didn't sound like it.

While it's true that bass forms the foundation of most any tune, an audio-production system shouldn't clobber you over the head with it. Wearing the FS1 buds was like listening to a band while sitting inside the bass player's amp. The lows in Beck's "Nicotine & Gravy" were fuzzy, ill-defined, positively amorphous blobs that threatened to smother the song's inherent complexity and precise timing. And that cracking snare drum attack on Steely Dan's "Jack of Speed"? Positively neutered.

But there's one lesson Etymotic could

ZEN AURVANA

+ EARRINGS
Great sound; nice extras; comfortable.

- EARWIGS
Tendency to be overwhelmed by heavy bass.

9

\$100, www.creative.com

ETYMOTIC ER-6 ISOLATOR

+ BEE'S WAX
Great sound; even better noise isolation.

- EAR WAX
Limited fit options; no extras.

8

\$130, www.etymotic.com



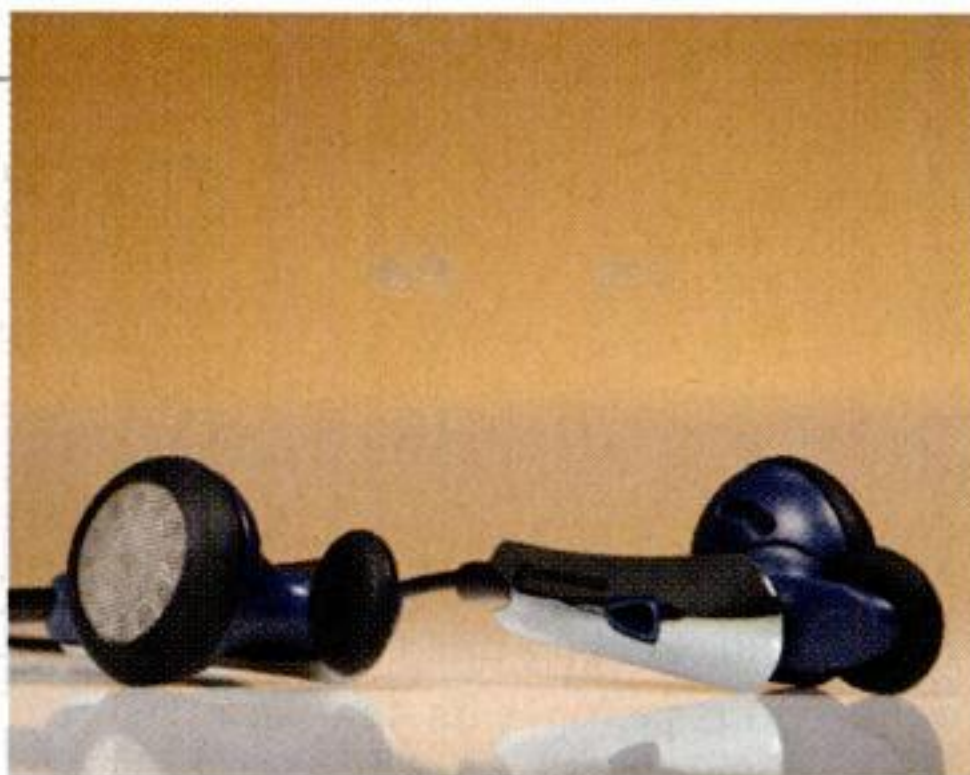
ExtremeMac's FS1 High Definition earbuds come with pretty packaging and a price tag that impresses for all the wrong reasons.

learn from ExtremeMac: There are more than two sizes of ears in the human race, and ExtremeMac provides no fewer than six different earplugs: two foam sets and four silicone. We found a foam set that rendered the FS1 buds very comfortable and blocked nearly all the environmental noise (aside from our fingers tapping on the keyboard), but they sure didn't help these bass monsters sound any better.

SENNHEISER MX 55 VC STREET

Even after finding a good fit, many people have trouble with earbuds inexorably sliding out of their ear canal. Sennheiser thinks it has the solution—it's called Twist-to-Fit—but we found this invention to be far worse than the problem.

The MX 55 VC Street's are an in-ear design, just like the other earbuds here,



Sennheiser makes some great headphones, but we wouldn't wish the pain-inflicting MX 55 VC Street earbuds on our worst enemy.

but the ginormous drivers are so big that your ear canal would have to be the size of Carlsbad Cavern for them to fit. The Twist-to-Fit design, meanwhile, wouldn't pass muster under the Geneva Conventions. It consists of a rubber-covered stem rising above the speaker. You place the earbud in your ear and twist to jam the stem into the fold in your ear.

If you can endure the pain, the MX 55's sound pretty damned good. They deliver solid bass response without losing touch with mids and highs. That's quite an accomplishment considering their low price tag. And we welcome the in-line volume control on the cable. But we're convinced that if Sennheiser were to apply its earbud-fit concept to the design of a hammer, it would have you nail the hammer to your hand so it won't slip out and hurt someone.

EXTREMEMAC FS1

- + EAR CANAL**
Diverse collection of plugs; cool carrying case.
- LOVE CANAL**
Passive-aggressive bass response.

6

\$150, www.extrememac.com

SENNHEISER MX 55 VC STREET

- + EAR CANDY**
In-line volume control—great idea!
- EAR INFECTION**
Twist-to-Fit—horrible idea!

4

\$40, www.sennheiserusa.com

SPECIFICATIONS

	FREQUENCY RESPONSE	IMPEDANCE	NUMBER OF EAR FITTINGS	EXTRAS
CREATIVE ZEN AURVANA	20Hz-20kHz	42 Ohms	6: 2 sets of 3 sizes (silicone)	Hardshell case; airline adapter
ETYMOTIC ER-6 ISOLATOR	50Hz-16kHz	48 Ohms	2: 1 foam; 1 silicone	Shirt clip; earwax filter
EXTREMEMAC FS1	20Hz-20kHz	32 Ohms	6: 2 foam; 4 silicone	Hardshell case
SENNHEISER MX 55 VC STREET	17Hz-21kHz	64 Ohms	3: 1 foam; 2 silicone	In-line volume control; soft case

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Gaming

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L23-7074 G15 Gaming Keyboard\$79.99



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Audio



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L23-6334 Z-5500 Speakers\$249.99

NEW!



ADD TO CART

Eliminate the clutter of rear speaker wires! The Logitech Z-5450 digital speaker package includes dual wireless rear speakers for simple, clutter-free installation. Satellite speaker stands rotate for easy wall mounting.

L23-7076 Z-5450 Digital Speakers\$349.99

Drive Buy?

Three oh-so-small drives with huge capacities

This month we've got three high-capacity USB drives in the Lab. Ranging in size from 100GB to 160GB, they're big enough to augment your laptop's base storage and perform backup duties for your notebook. We use them in the Lab for benchmarks, patches, and drive images that are just too big for a USB key. Indeed, no hardcore geek should be without one!

—JOSH NOREM

SEAGATE 160GB PORTABLE EXTERNAL

Seagate's portable external drive sports the highest capacity in its class, by 40GB, thanks to its perpendicular recording technology, which packs more data on every platter of the hard drive. It comes in a rough-and-ready aluminum enclosure that keeps the drive both safe and cool.

Inside the shell sits a 5,400rpm Seagate Momentus drive with an 8MB cache. The drive includes *Bounceback Express* backup software, which is adequate. Our only gripe is that it's not the full-featured version of the software, and thus quite limited, especially when compared with Maxtor's *One Touch* software offering.

During speed tests, the Seagate

was right in the thick of things. In our 5GB read and write tests it took second place, lagging slightly behind the Maxtor drive (reviewed next), but the two drives' performance was virtually tied.

So, the Seagate drive's only serious failing is its software package. If you don't need the backup software, however, this is a great drive, especially considering its gimungous capacity.

MAXTOR ONE TOUCH III MINI 100GB

Maxtor has downsized its awesome One Touch Turbo desktop backup drive into this 100GB Mini model. It looks exactly the same as the Turbo, and comes with the same excellent software.

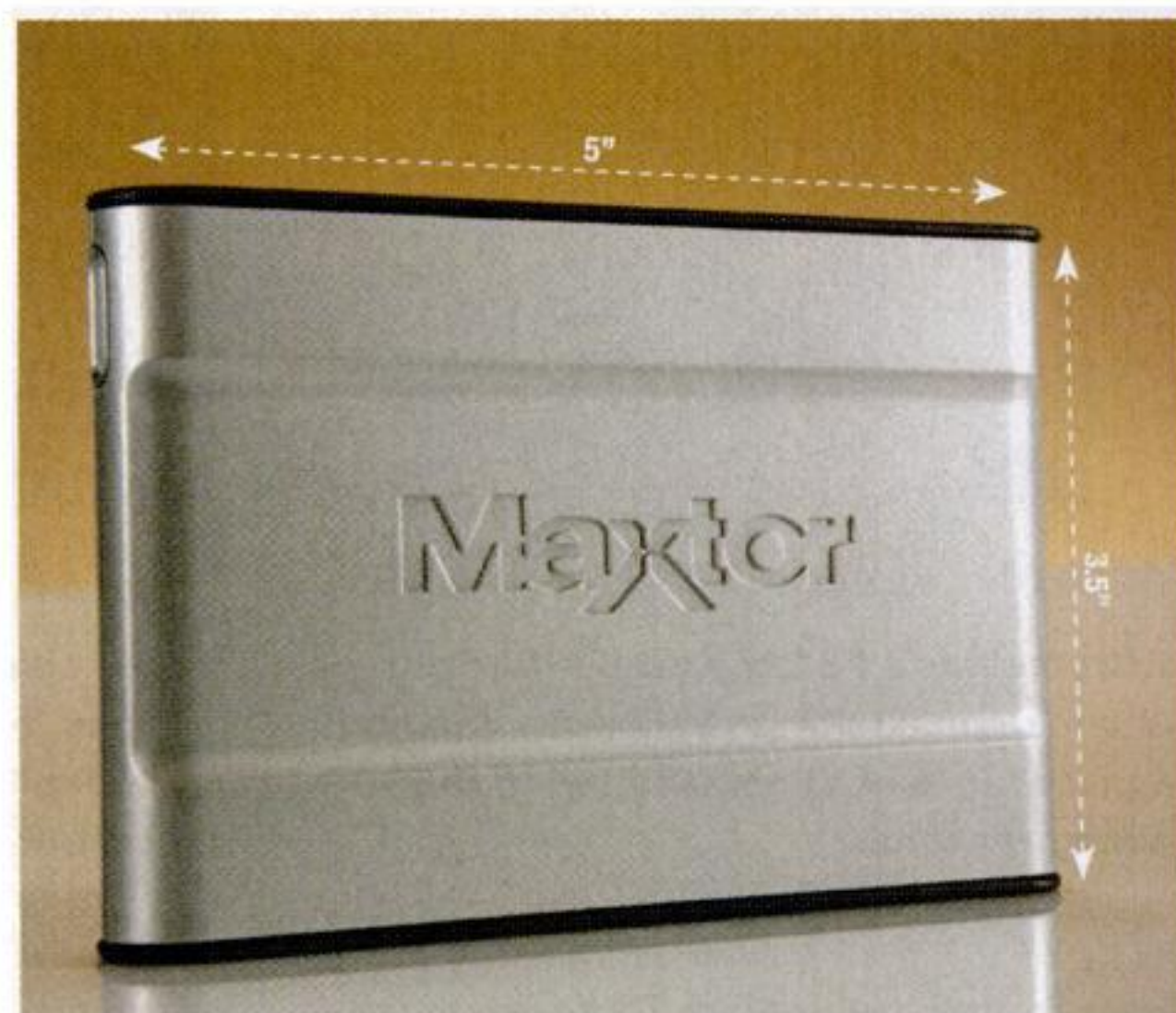
The Mini uses a 5,400rpm drive with an 8MB buffer. Even though it has a lower areal density (the number of bits packed onto the drive's platters—higher is better) than the Seagate drive, the Maxtor drive outperformed Seagate by a small margin in both our 5GB read and 5GB write tests.

The star of the show is the software, which is easily the most fully featured package we've ever seen for a drive this size. It lets you password-protect the drive, set folders to automatically sync, restore deleted files, and lots more.

Sure, the Mini delivers the least capacity in this roundup, but 100GB is enough for us. If you're shopping solely for storage space, by all means get the Seagate, but if you want a drive for backup and syncing, it doesn't get any better than this.

WESTERN DIGITAL PASSPORT 120GB

WD's Passport is an all-around decent product, with a lot of storage and handy software, but fails to distinguish itself from the Maxtor or Seagate products in any meaningful way.



Though it packs only 100GB, the Maxtor Mini offers a full-featured software package that makes up for its slight capacity deficiency.

We have no beef with the Passport's capacity, as 120GB is more than enough storage for us. We don't even mind the form-factor that much. The chassis is the same size as Maxtor's, and a smidge longer than Seagate's, making it too big for a pocket, but just fine for refuge inside a laptop bag. The rounded edges look a bit odd to us, and we don't like that we have to pull down a rubber cover to access the USB port. As far as performance goes, it's close enough to the other drives to call a draw.

Where the drive fails to keep up with the Joneses is in the software department. Although the included *WD Sync* software seems quite capable in isolation, it pales in comparison to the software shipped with the other drives here. It's more difficult to use, more limited in its scope, and not as user friendly as we'd like.



WD's Passport drive is a plain-vanilla product that works well but failed to blow us away.



Seagate's 160GB drive shatters the 2.5-inch capacity record, thanks to its use of perpendicular recording technology.

SEAGATE 160GB EXTERNAL

+

PORTO DRIVE

Huge capacity, rugged shell, and decent software.

-

PORT-O-POTTY

Software bundle is lacking compared with Maxtor's package.

9

\$290, www.seagate.com

MAXTOR ONE TOUCH III MINI 100GB

+

PLATTER

Decent capacity, kick-ass software, and a sleek design.

-

FATTER

Only 100GB.

9

MAXIMUM PC KICKASS

\$180, www.maxtor.com

WESTERN DIGITAL PASSPORT 120GB

+

PASSPORT PLEASE

Great capacity; rubberized shell.

-

PAPERS PLEASE

Annoying USB-port cover; so-so software.

8

\$200, www.wdc.com



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Next Generation Processing Has A Name: Core 2 Duo.



WHAT IS CONROE?

Conroe is the codename for Intel's desktop-optimized dual core processors, Core™ 2 Duo and Core™ 2 Extreme. Core 2 Duo is poised to replace Pentium 4 as the flagship product of the Intel brand. Based on the new state-of-the-art Intel® Core 2 Duo architecture, Core 2 Duo processors feature numerous power-efficiency advancements and deliver exceptional performance when running high-demand applications.

With up to 4MB of shared L2 cache and a much faster mainstream front-side bus (up to 1066 MHz, delivering 8.6GB/s bandwidth), power users are sure to drool over the increased responsiveness of Core 2 Extreme. The entire cache can also be allocated to one core meaning that with two apps running simultaneously, the most cache-needy application can commandeer as much of the remaining cache space it requires.

Core 2 Extreme also makes the best use of its



WHO IS CORE 2 EXTREME FOR?

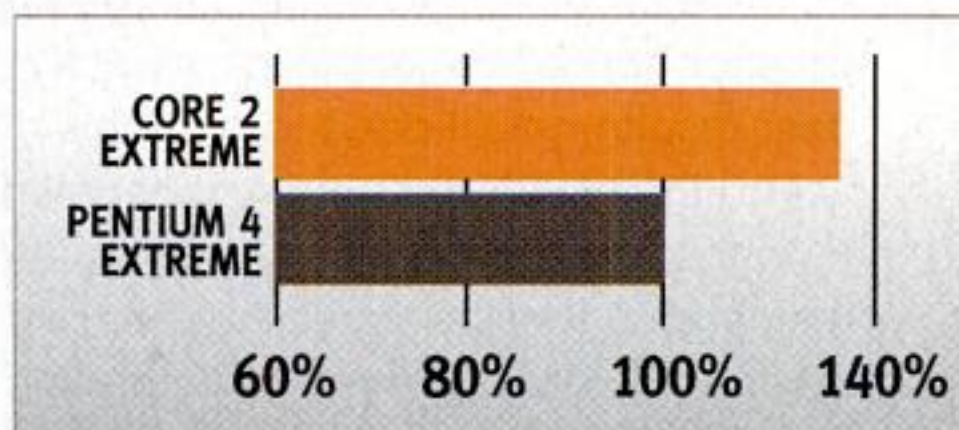
Early adopters who want the latest and greatest, hardcore gaming enthusiasts who demand the best performance available and IT staff looking to support demanding tasks like video conferencing, multithreaded applications and multitasking.



THE COMPETITION

Core 2 Extreme processors are Intel's highest performance dual-core engine and should stand head and shoulders above the competition in terms of pure processing punch and energy-efficiency.

Initial benchmarking on tasks such as 3D gaming and media playback show a significant performance edge when placed head to head against Intel's previous Pentium 4 Extreme Edition processors.



This being said, in the coming months expect the competition to keep pace, with Core 2 Extreme processors most likely setting the bar as the performance leader.



WHEN WILL WE SEE CORE 2 DUO PROCESSORS?

Core 2 Duo processors are available now and will be included on PC platforms with Intel vPro technology. Alienware will be installing Core 2 Duo processors on its next-generation Area-51 desktop chassis.

Area-51[®] 7500



The new Alienware P2 Full Tower Chassis has an incredible amount of innovative new features like Alienware SpectraFX, which allows users to custom configure different lighting zones on the chassis with the full spectrum of colors.



Powerline Power Play

Two adapters enter, one adapter leaves

We've been pretty hard on powerline networking products in the past. The deadly combination of pathetic throughput, worse-than-Wi-Fi range, and an utter inability to pass UPNP packets has so far rendered powerline technology useless to anyone. This month, we're going to pit two differently spec'd powerline adapters against each other—Zyxel's "85Mb/s" PL-100 vs. Netgear's new "200Mb/s" HDX-B101. Will either live up to its performance claims? More importantly, does either deliver enough bandwidth to reliably stream high-definition content?

—WILL SMITH

ZYXEL PL-100

The Zyxel PL-100 uses the same Intellon INT 5500CS chipset that Netgear's XE104 uses (reviewed May 2006) and the results are predictable. In our bandwidth tests, we managed a mere 1.2Mb/s—slower than our DSL line. Surprisingly, the PL-100 wouldn't even work in some of the rooms where the XE104 connected easily. We were unable to connect two adapters if they weren't plugged into the same electrical circuit in our test home—a recently remodeled flat in San Francisco. Shockingly, the software that comes with the adapters reported our performance as an astounding 85Mb/s.

To add insult to injury, the PL-100 had the exact same problem passing Universal Plug and Play packets that the XE104 had. Because it won't pass the UPNP packets, this device is virtually useless for streaming video or even audio from one room to another. The lesson is to just stay away from any hardware using the Intellon INT 5500CS chipset.

ZYXEL PL-100

+ LEAD WEIGHT
Neither man nor computer was harmed during testing.

- LEAD PAINT
Couldn't connect in many rooms; pathetically slow when it worked.

1

\$110, www.zyxel.com

NETGEAR HDX-B101

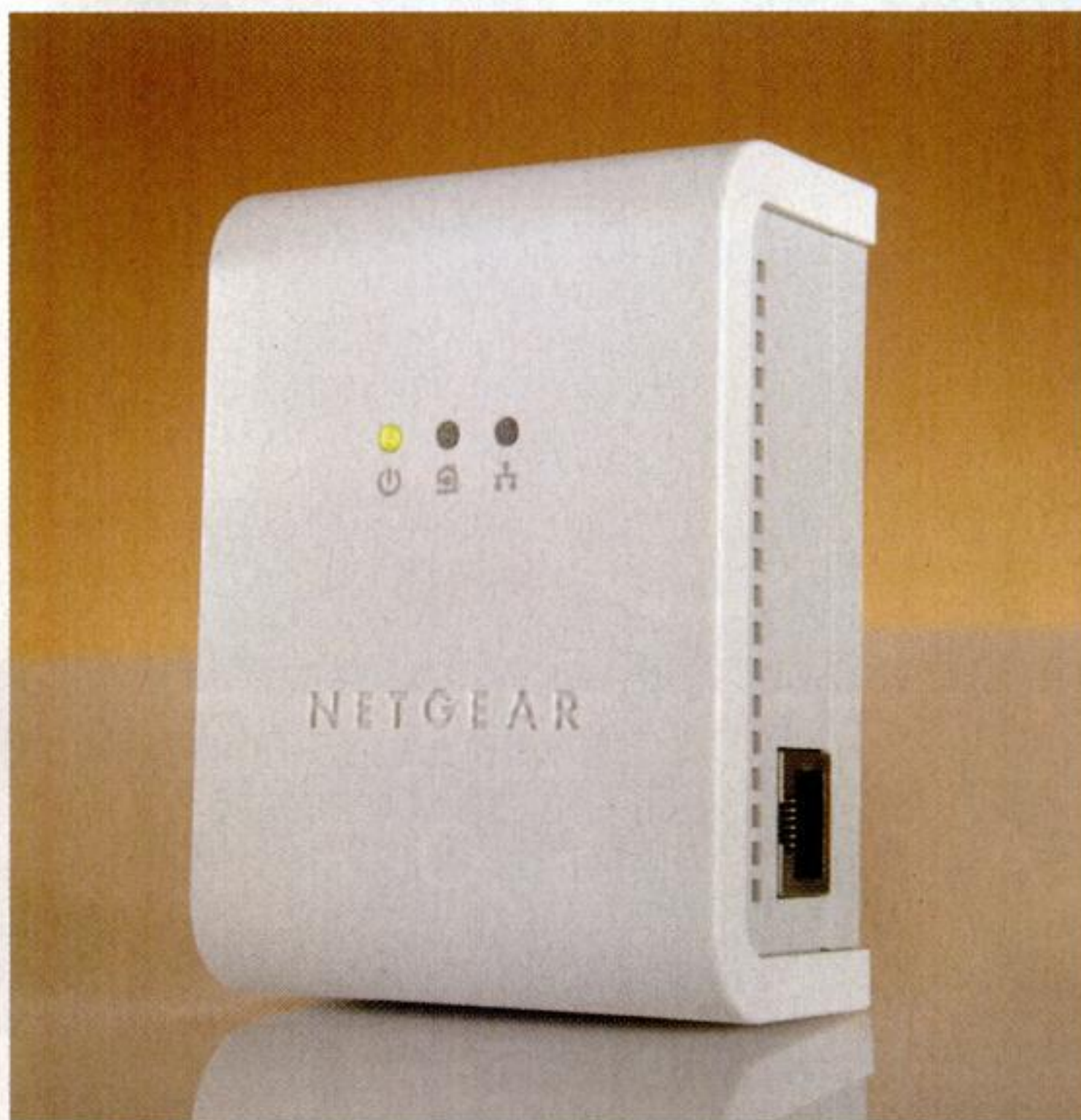
Brace yourself for this one, folks: The HDX-B101 powerline networking hardware actually delivers on its performance claims. Take a moment to breathe.

The bottom line is that the HDX-B101 is fast enough to stream video—even high-definition video—from your media server to your living room. We successfully streamed video content—including 1080i WMV movies—across the powerline network. UPNP packets even cross the powerline segment flawlessly—our UPNP-dependent streaming boxes worked without a hitch. Even the bandwidth hungry Media Center Extender and Xbox 360 worked with nary a hiccup or dropped frame.

If you're interested in the actual performance numbers, the HDX-B101 compares favorably to 100Mbit Ethernet—with an average throughput of 15Mb/s. It's certainly not Gigabit Ethernet speed, but it's fast enough for video.

Even with the improved hardware, powerline networking isn't totally bozo-proof. In order to get HD-capable throughput, we had to experiment with several different outlets in our computer room and our living room—and using a surge suppressor borked the signal completely. For best results, you'll need to plug this directly into the wall. After a little experimentation, though, we managed to find outlets in every room that delivered top-tier performance. We do, however, miss the convenience of the integrated four-port Ethernet switch, which Netgear's XE104 included.

The box for the HDX-B101 tells an interesting story. Instead of listing a wildly inflated theoretical maximum bandwidth, Netgear makes one simple promise:



Netgear's HDX-B101 actually delivers enough speed to stream HDTV over your powerlines. Well done!



Zyxel PL-100 sucks every bit as much as the other powerline networking gear we've tested.

"Stream HD video over Powerline," and it delivers with the first HD-streaming solution that doesn't require running Ethernet. Bravo, Netgear.

NETGEAR HDX-B101

+ HD TV
It works. It really works. And you can even stream HD.

- HD OPTICAL DISCS
Where's the integrated Ethernet switch? Twitchy at maximum speed.

9

\$230 for two, www.netgear.com

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Skype Phone Scuffle

Two VoIP phones get turned on

Skype's voice over IP (VoIP) is the bomb, but wearing a goofy PC headset on a Skype call is a bummer. That's why we decided to try ditching our traditional wired headset to use these cordless VoIP phones. Let's find out which one of these phones will keep you best connected to your Skype-obsessed grandmother in Malaysia.

—TODD HASELTON

LINKSYS CIT200

This phone is sexy. Sounds funny doesn't it? Cordless phones are supposed to be boring, black or gray, and for the most part, featureless. The CIT200 looks like a slightly oversized cellphone—it even has a color screen and easy-to-use menu options like its cellular cousin. Once you've juiced up the phone and installed Skype and the handset's drivers, you can plug in the phone's USB



The Dualphone is ugly, but it sounds better than the Linksys and it works with our standard telephone service.

transmitter and you're good to go.

When you're ready to Skype your aunt in Idaho just select Contacts, scroll to her name, and if she's signed into Skype, you can click Call. The phone held a solid signal around our office, which has plenty of walls, and the voice quality remained good within about 85 feet of the transmitter.

We have one bone to pick with this phone, however—it doesn't have support for typical analog phone lines. If you're going to use this in conjunction with the line already running into your home, you'll need a separate phone for that.

Unlike the stand-alone Skype phones (which are much more expensive), your PC must be turned to use the CIT200. And while you can make and receive land-line calls to and from normal phone numbers with it, you'll need to subscribe to the SkypeOut and SkypeIn subscription services to do so.

LINKSYS CIT200

+

GI JOE

Easy to use; color screen; sleek look and feel.

-

BARBIE

Doesn't work with land lines.

7

\$130, www.linksys.com

NEW TECH DUALPHONE

Double cheeseburgers, dual videocards, Nickelodeon *Double Dare*. Things that come in pairs always seem to be good, and the Dualphone is no exception. Plug in the phone, hook up its base via USB to your computer, and plug in the phone line. As long as you have Skype installed, you can receive and make calls via your computer through your Skype connection. Voice quality is excellent for Skype calls. Most phones stop at this option, but the Dualphone keeps going. If you want to make or receive calls through standard telephone lines, you can. The phone has two call buttons, both sport green telephone icons, except one is labeled "PC", so you know you're making a VoIP call instead of a normal phone call.

Still, we have a few problems with this phone. For one thing, it's ugly—really ugly: It looks like a standard, gray, boring, cordless phone with a poorly lit monochrome screen.



Sexy like a cellphone, Linksys' CIT200 lacks support for plain-old telephone service.

And trying to figure out the menu navigation is frustrating. Without icons, the menu is confounding—we found ourselves constantly referring to the instruction booklet. The good thing is that, unless you're storing numbers in speed-dial memory, you'll only need to use the menu to contact friends on the Skype list. If they're online, their names show up, otherwise they won't be on the list.

The manufacturer advertises a 1,000-foot talk distance for the Dualphone; we were only able to receive a clear signal up to about 90 feet in our office, but the sound quality was noticeably better on this phone than on the Linksys CIT200.

It's hard to fall in love with something so hideous, but the phone works as both a cordless phone and a Skype phone, which is pretty attractive.

NEW TECH DUALPHONE

+

GI JOE

Clear reception; supports land lines and Skype VoIP calls.

-

BARBIE

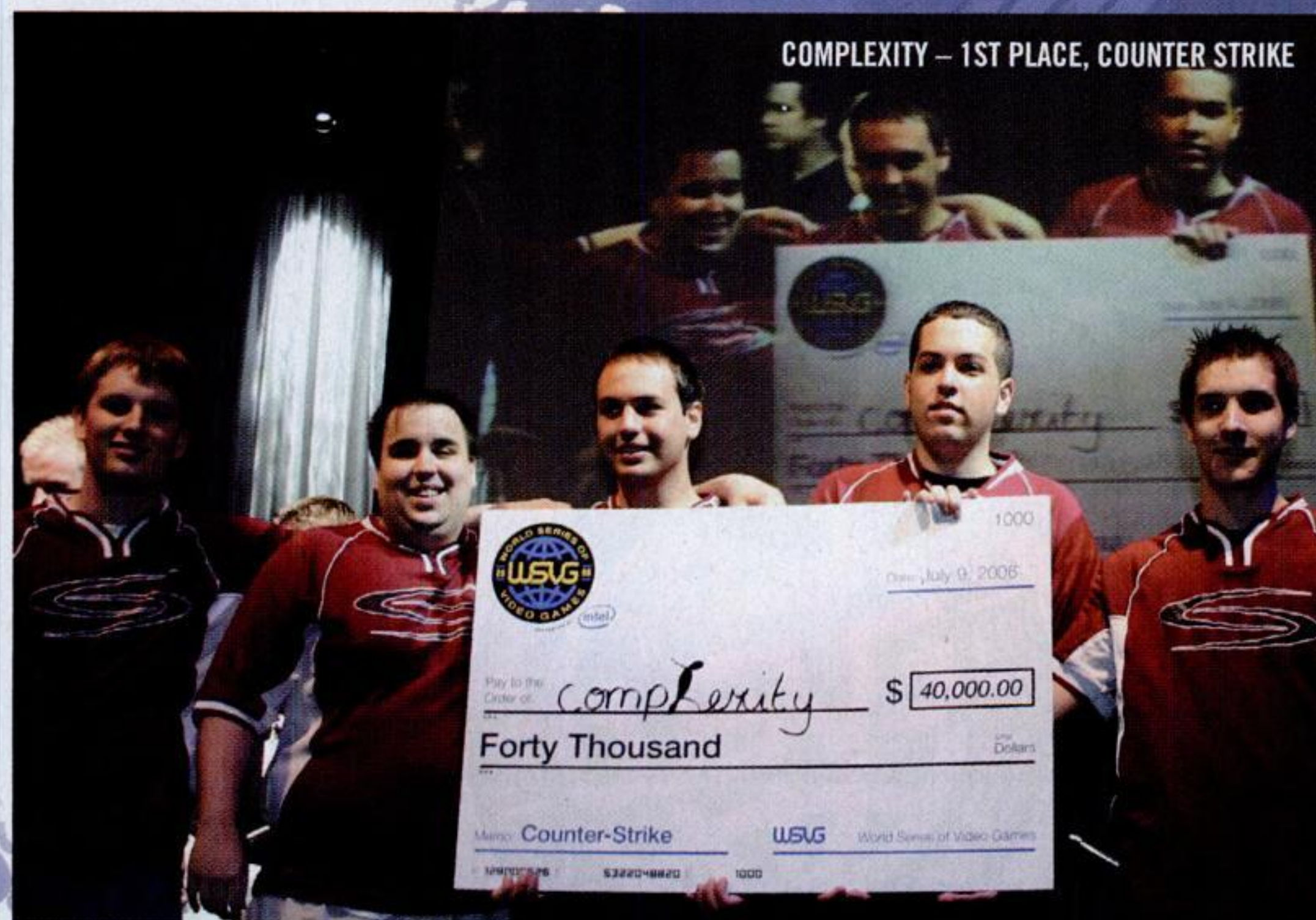
Ugly; confusing menu.

8

\$120, www.skype.com

INTEL SUMMER CHAMPIONSHIPS JULY 2006

THE INTEL SUMMER CHAMPIONSHIPS SCORCH TEXAS.



BY BRAD DICKASON, AMPEDESORTS.COM

THE ACTION IN GRAPEVINE WAS HOTTER INSIDE, than the scorching asphalt outside the Gaylord Texan Resort, home to the Intel Summer Championships in July. The best PC gamers in the world flocked to the enormous tournament area, playing non-stop matches for three days straight to determine who would emerge with two crucial spots to the World Series of Video Games grand finals.

In the Counter-Strike 1.6 competition, the American powerhouse compLexity, led by the sharp-shooting prowess of Danny 'froD' Montaner, took down the German team ALTERNATE aTTaX in a best of two series. In the individual Quake 4 arena, Fatal1ty's Italian protégé Alessandro 'Stermy' Avallone failed to defend his title earned at LANWAR, dropping a best of seven series to the Swedish veteran Johan 'Toxic' Quick.



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Titan Quest

We like this romp around the ancient Mediterranean

You remember all the boring classical Greek mythology classes you sat through in high school? Sure, sitting through the yarns about gods fighting, making up, and occasionally molesting a particularly attractive human were better than an afternoon in calculus, but you wouldn't want to relive those adventures again today, would you? We sure as hell don't want to struggle through *Bullfinch's Mythology* again, but we'd love a second helping of *Titan Quest*.

The story is simple. Some young whippersnapper gods locked their parental gods in a god prison. Then, over time, the elder gods got pissed and broke out of the prison and commenced wreaking havoc on everything around. Your job as a lowly mortal (with nothing more than a meager weapon and a tenuous grasp on magic) is to defeat the god elders. Naturally, you'll begin small, facing off against centaurs, skeletons, and zombies before you move on to more frightening fare.

For people who enjoy the typical mindless action-RPG, *Titan Quest* is a lot of fun. It adds a few small cosmetic touches to the genre—ragdoll physics replace the traditional death animations, for example, and makes the game much more entertaining to watch. The graphics are superior to every other action RPG we've played, and the game world is positively massive. We spent more than 30 hours beating the main quest the first time, which then unlocks a higher difficulty level so you can run through the quest again, picking up still better loot and learning even more skills.



Because the baddies are animated with ragdoll physics, large explosions will chuck their corpses across the map!



During your epic journey, you'll fight increasingly impressive enemies with all sorts of different powers.

The multi-class system adds a multitude of choices to the game. In the beginning portions of the game, you'll choose two of the eight available classes, then spend points (which you earn each time you gain a level) to learn new skills, improve them, and unlock even more powerful abilities. By choosing different classes and skills, you'll get a different experience each time you play the game.

Co-op play kicks ass; we spent several happy sessions playing through the main quest in small parties—with each player controlled by other people. Playing multiplayer opens new doors for character customization. You can specialize in one particular field; instead of a good balance between melee defense and ranged magic use, you can focus on one or the other. No Jacks of All Trades are needed in a large group.

There's plenty of room for improvement in the game, though. The utter lack of inventory-management in the game's UI is frustrating, especially for a game that delivers such an unbelievable amount of loot. We spent way too much time rearranging our loot to fit in the extremely limited inventory space. Furthermore, the game only gives you a vague indication of what the different items are worth, so it's difficult to know what you should keep (to sell) and what you should just drop. Also, we found the melee combat to be frustratingly difficult. We frequently ended up chasing fleeing enemies, and the boss monsters were too powerful



Beware the bosses and their impressive spell effects. The flames really sting!

for toe-to-toe tussles. We ended up kiting them—a very difficult prospect with short-range weapons only.

Despite its few minor flaws, *Titan Quest* delivers a ton of extremely fun content for the RPG aficionado. The story is engaging, the graphics are beautiful, and the monsters are plentiful.

—WILL SMITH

TITAN QUEST



CRONUS

Great story, graphics, and gameplay. 30+ hours of fun!



SATURN

Loot management and inventory need some work. Too much loot!



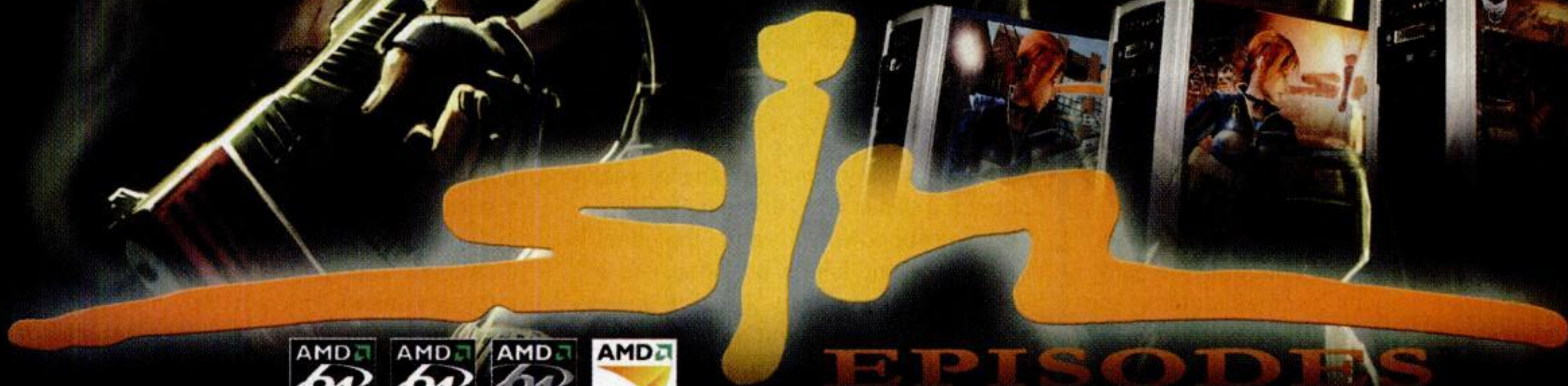
• \$50, www.titanquestgame.com, ESRB:T



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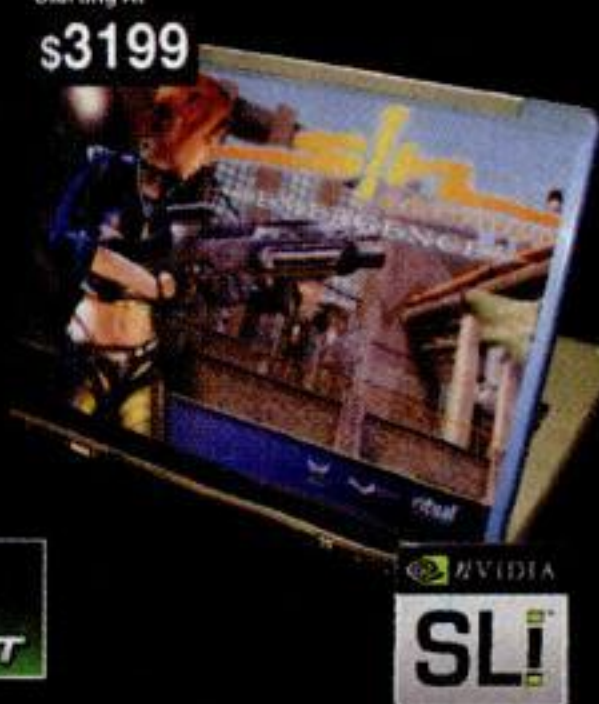


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Prey

A fun game, when you aren't hurling

Prey has been a long time coming—it was originally announced in 1997, then cancelled, and then recently revived. Though it brings some innovative gameplay to the table, by the time you get to the end (the game's only four to six hours long), *Prey*'s run out of tricks and it plays just like any other shooter.

We should state right from the start that this game, like many other shooters, begins brilliantly. You are a Cherokee Indian enjoying an evening in your girlfriend's bar, when all of a sudden an alien ship sucks you, your girlfriend, and your grandfather into its underbelly. This totally kills your buzz, obviously, and for the next few hours it's up to you to lay down some Native American smack on the alien interlopers. You don't have any clue what's going on for the first few hours of the game, which we found frustrating. We don't need a story spoon-fed to us, but we would have appreciated just a little more exposition. As it is, it's not until the game's finale that everything comes together and makes sense.

In most respects, *Prey* is a fairly standard first-person shooter, but the game does innovate on several fronts. The first "new" thing is the game's use of portals, which allow you to move from one area to another unconnected area by stepping through a wormhole. Though they're used in a few simple puzzles, the portals are essentially nothing more than fancy doors.



Prey is full of portals, and they look way cool. Unfortunately, they're nothing more than fancy-looking doors.



It's time to wash this guy's mouth out with slime.

It's a shame they don't add any interesting or unique dimensions to the gameplay.

The second way in which the game innovates—and is truly a pioneer—is in upside-down gameplay. Through the use of vertical walkways and switches that invert the environment, you find yourself walking on the ceiling and shooting at bad guys above you, below you, or on the walls next to you. Some rooms have switches that you shoot to invert the entire room, causing you to flip upside down. It's utterly sickening at first, and your character brilliantly says "I'm going to be sick!" if you flip-flop the gravity too much. Then he pukes his guts out, just like you feel doing. The first time the world turns, it's an exceptional gaming moment, and after a few spins the upside-down action becomes more tolerable.

We also like the game's "spirit walk" feature, where you leave your body and walk around like a ghost. You use the feature to solve rudimentary puzzles, and we enjoyed slaughtering enemies and swallowing their souls in spirit-walk mode.

Where the game comes up short is in the FPS bread-and-butter: combat, weapons, and

puzzles. The weapons are interesting in that they are all organic (living, breathing creatures, in other words), but for the most part, they're just the standard FPS fare—reskinned. The only truly original weapon is a creature whose legs double as grenades. You tear one off and chuck it at your foes, then watch them go boom. The sniper rifle/machine gun, rocket launcher, and shotgun all look very cool but deliver no new thrills. The combat is utterly forgettable, with dumb AI, and nary a memorable incident or foe to be found. The puzzles are frustrating, unintuitive, and repetitive.

"MultiPreyer" could be entertaining, as the game's gravity-switching, wall-walking, and portal gimmicks play a prominent role. But the included maps are all too massive—more suited to a 32-player fragfest than an intimate eight-man encounter. And they're much too large for the one-on-one stalking that the weapons would be perfect for.

—JOSH NOREM

PREY

+

WALL-WALKING

Looks great, wall-walking is cool, and portals are fun.

-

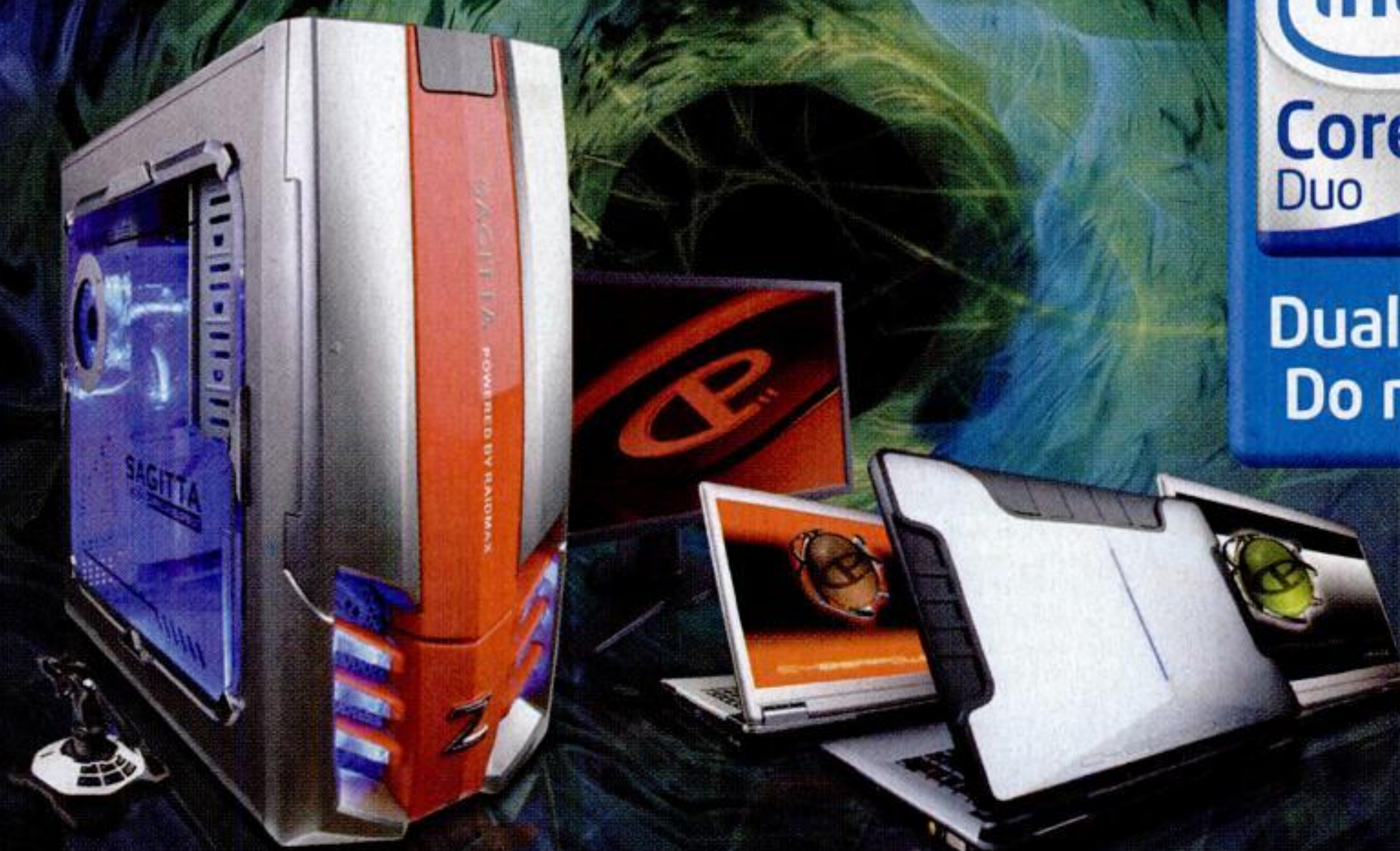
UPCHUCKING

Bland combat and enemies, so-so MultiPreyer, and too short.

7

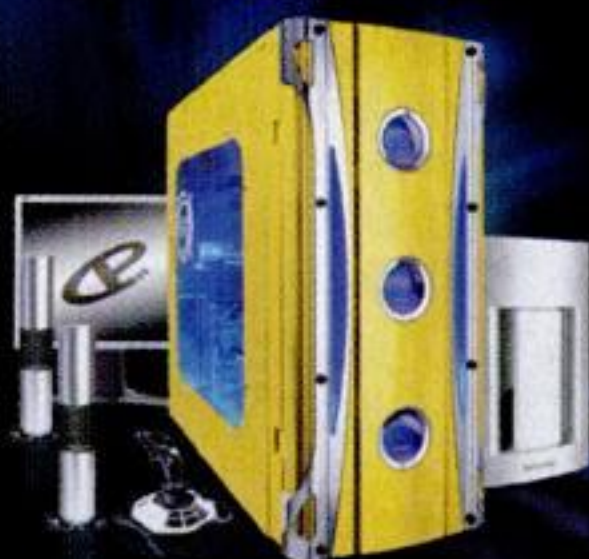
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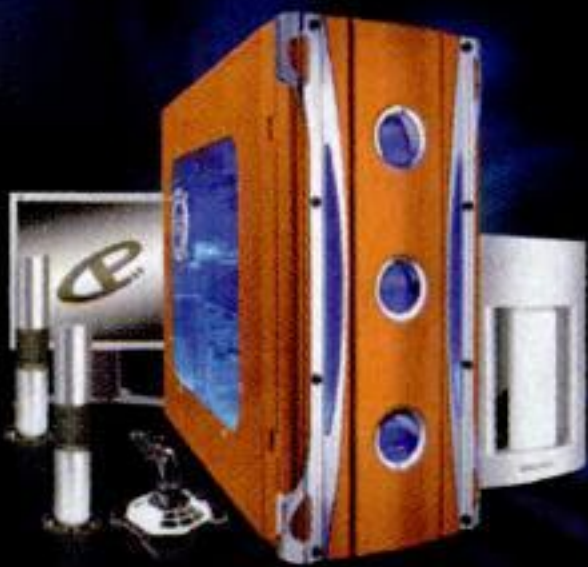
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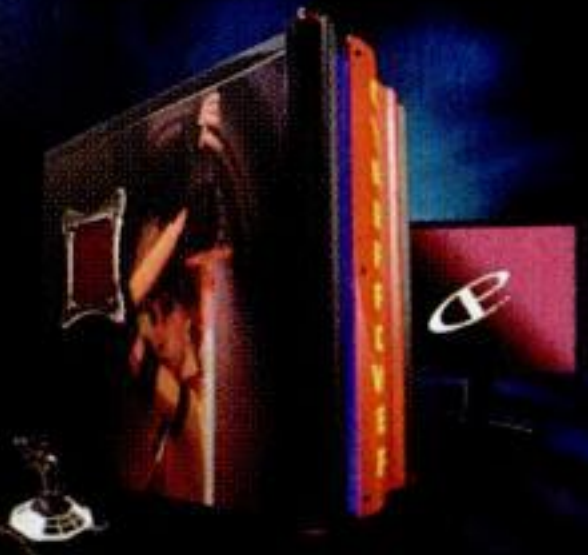


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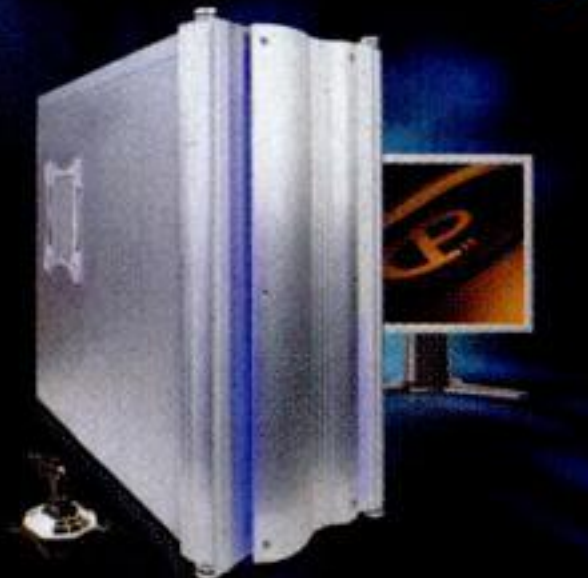


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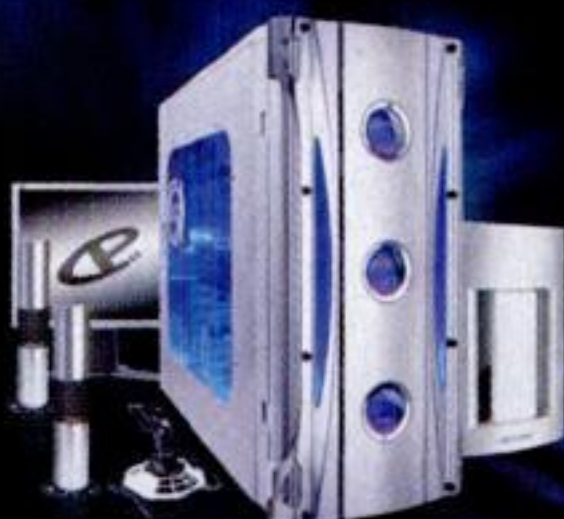
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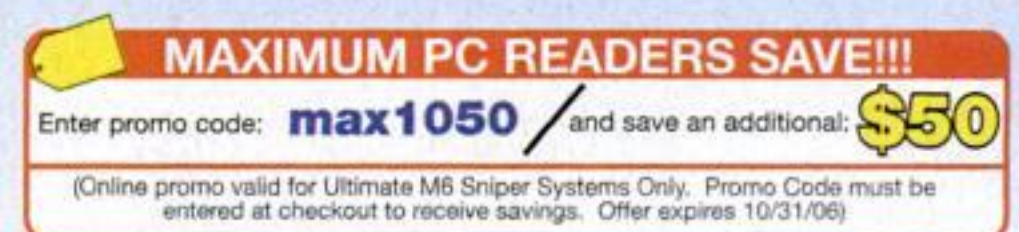
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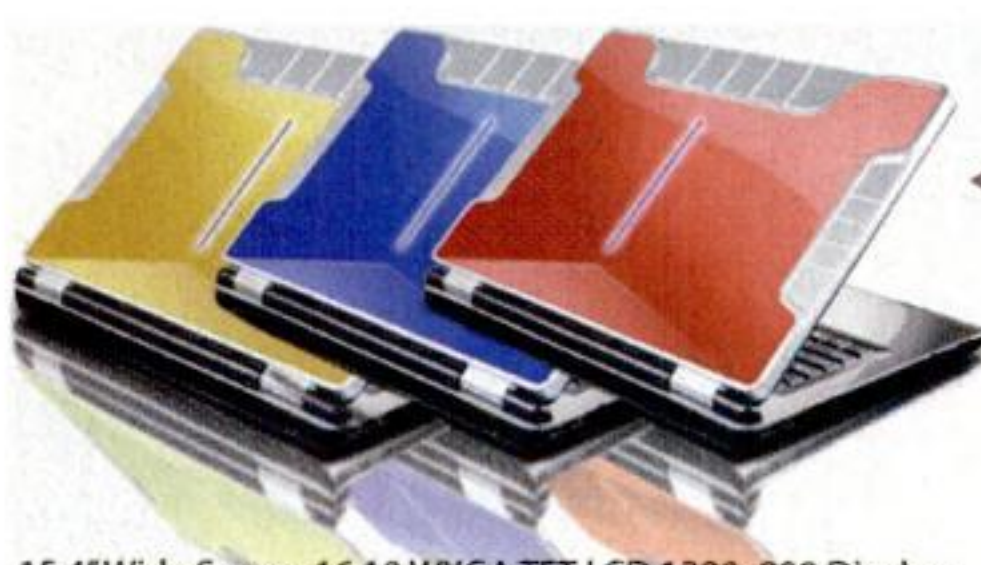


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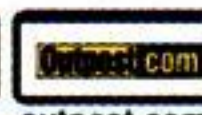
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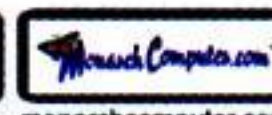
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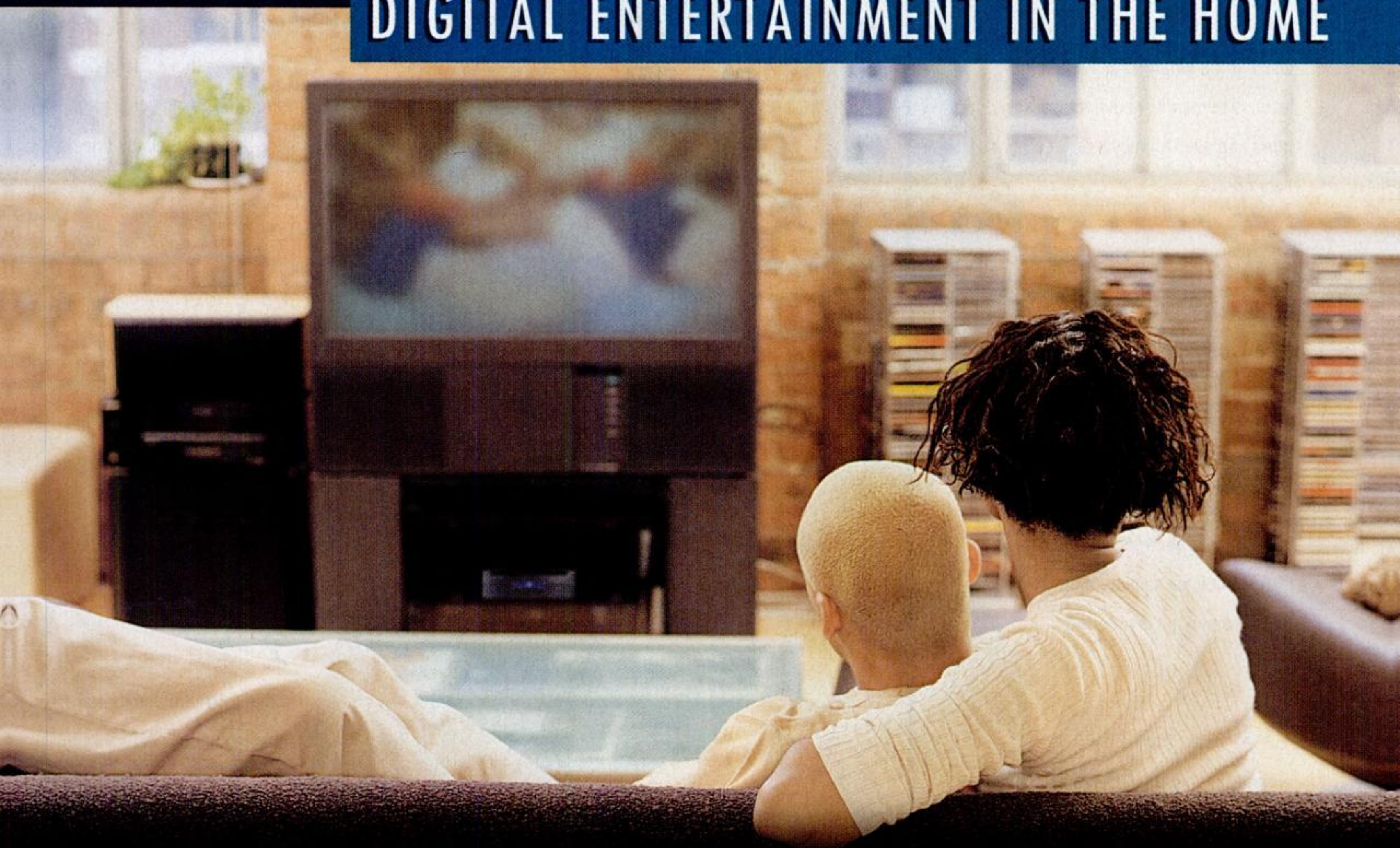


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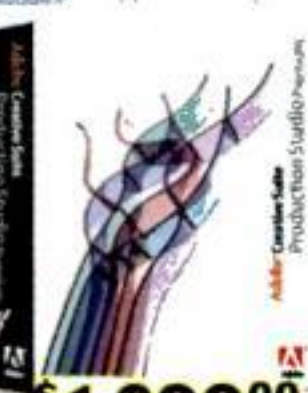
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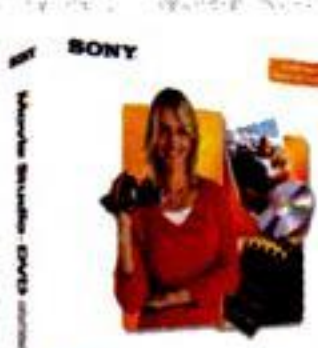


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We tackle tough reader questions on...

✓ Cat Fancy ✓ Alan Parsons ✓ GPU Power
✓ DM2006 ✓ Windows Defender

WE'LL SKIP THE OBVIOUS JOKE, ALAN

I'll keep this short, sweet, and to the point. Will there be any dual-processor motherboards that can run dual-core processors or do I have to wait for quad-core CPUs? Would something like that even be a good idea? Wouldn't having a dual-core, dual-proc mobo make things run better and get a jump on the quad-core procs?

—Alan S. Parsons Sr.

SENIOR EDITOR GORDON MAH UNG RESPONDS: You can indeed buy dual processor boards that support dual-core CPUs today, but you'll have to step up to an AMD Opteron or Intel Xeon motherboard. Intel doesn't believe dual-processor boards make sense for consumers today because of the extra cost associated with them (two heatsinks, bigger power supply, thicker, more expensive mobos). The first consumer quad-core for Intel will likely be a quad-core CPU later this year that will drop into Core 2-ready motherboards. AMD's consumer strategy is different. It will likely offer a quad-core processor that works in the AM2 socket next year, but it's also pursuing a "4x4" technique, which gives true power users a dual-processor mobo that doesn't need expensive and slower registered RAM.

FLASHBACK TO THE VOODOO5

I saw a product on the Monarch Computer website that I would like to know more about. The product is Thermaltake's PurePower VGA 250W power supply. This looks like a good alternative to upgrading a perfectly good PSU.

—Murray Kreeger

SENIOR EDITOR JOSH NOREM RESPONDS: The Thermaltake Pure Power 250 is a stand-alone power supply that resides in a 5.25-inch bay and is designed to power two videocards in SLI. It includes two PCI Express power cables and is listed on nVidia's website as a "certified" solution for SLI. Though we haven't tested it in the Lab yet, the fact that it's certified by nVidia to work just fine is promising, and we should mention that only a handful of PSUs have received this distinction. If you've got a

wimpy 300W (or thereabouts) PSU and want to upgrade to SLI without buying a brand-new PSU, it seems like this would be a safe course of action.

MEMORIES OF THE WAY WE USED TO BE

I received the latest Maximum PC and was confused by the memory used in the Dream Machine. The article states that DM2006 uses Corsair DDR2 memory/800. However, it states that the memory is rated to operate at 1066MHz. Furthermore, it lists the price as \$195. I've gone through the Corsair website looking for this module and can't find it. Please help.

—Basker Periyasamy

SENIOR EDITOR GORDON MAH UNG RESPONDS: You're looking for Corsair's TWIN2X1024-8500 modules, which are rated to run at 1066MHz at 5-5-5-15. Unfortunately, we goofed on the pricing. It should have been \$195 per module.

WHAT'S BETTER THAN MSCONFIG?

This is a late letter because I'm not a subscriber. In your May 2006 article "Fastest Boot..." you men-

tion using Msconfig to clean up the start-up items. But Msconfig is pretty confusing to laymen, and Windows Defender has a feature named Software Explorer that does the same job but a hundred times better. It gives you every bit of information possible on each start-up item, and also does the same to Running Process, Network Processes, and Services. I know of a lot of people who think Windows Defender is just a tiny spyware scanner and never really use the Software Explorer under Tools. Maybe you can spread the word.

—Louis

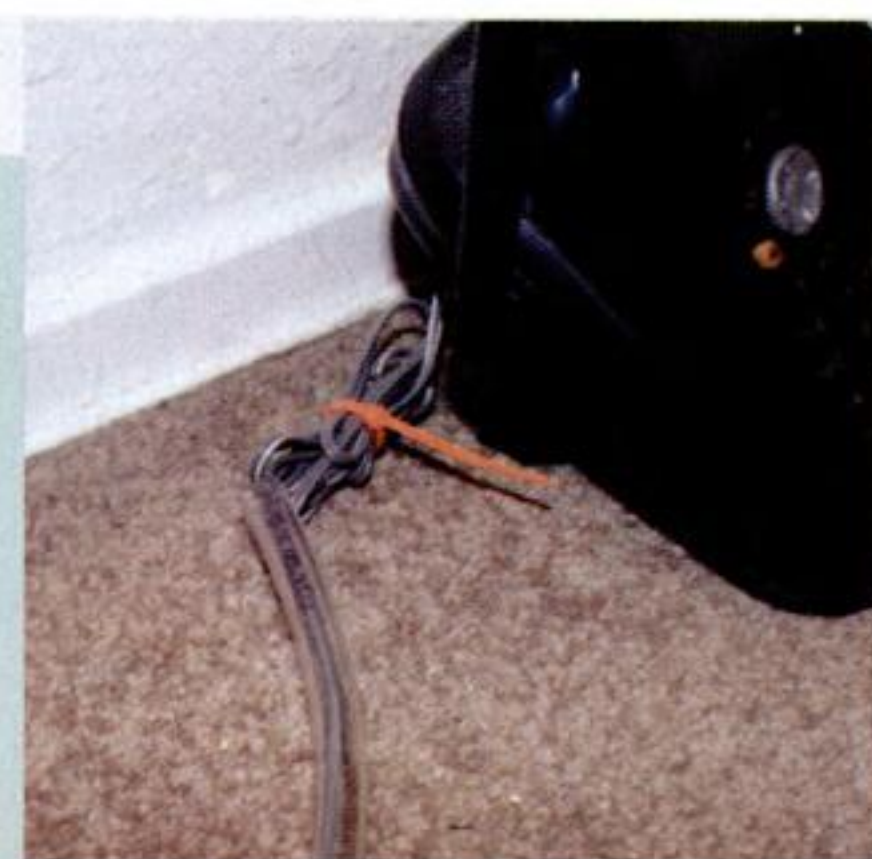
SENIOR EDITOR JOSH NOREM RESPONDS: Whoa. We've used Windows Defender before and weren't aware of this feature. And here's why: As you mentioned, Windows has cryptically labeled the feature Software Explorer. And we wouldn't even think to look for such capability in an anti-spyware utility. But you're right, it does offer a lot of information—certainly more than you get from Msconfig. Thanks for the tip.

Bad Kitty

My cat chews through phone cords a lot. I am not sure how to deal with this. I bought this thing for dogs that tastes bad and put it on the cords, but it wore off—recently, I saw my cat starting to chew my computer's power cord. I know some editors have cats, so, have they had these problems before? Is there anything I can do to stop it? I'm going to put duct tape over all the cords soon if I don't get a response.

—Mick "Dr. Satan" Reedy

SENIOR EDITOR JOSH NOREM RESPONDS: We've had the same issue with a few havoc-wreaking felines of our own, Doc. The solution is simple: Go to the hardware store and buy some clear vinyl tubing (the same kind



Water-cooling tubing is good for more than just cooling your rig! Use it to protect delicate cables from chomp-happy kitties.

you'd use in a water-cooling kit, actually). Slice the tubing lengthwise with a razor blade, and then stuff the phone cord into the tubing (as shown). Problem solved.

SEARCHING FOR MAXIMUM PC

In a recent article on Vista (June 2006), you discussed the new search capability. As an example, you mentioned you'd be able to search for the number of times the word "asstatic" has appeared in **Maximum PC**.

Is there a way the readers can use current desktop searches to get this same functionality, or is this ability largely due to the fact that you have every copy of **Maximum PC** in a file on your computer? If every reader could access this kind of information it would help us get the maximum out of **Maximum PC**.

—Jesse Bright

EDITOR IN CHIEF WILL SMITH RESPONDS: Dozens of readers asked this question. Unfortunately, it only works because we have a copy of every piece of edit that's gone into the magazine over the last six years on our office file server, and I added that directory to my desktop search app.

LOOPING WATER AND YOU

I wondered about something I saw in your "Do-it-Yourself Guide" (July 2006). You recommend configuring your water-cooling loop in the following order: reservoir to pump to radiator to cooling blocks and back to the reservoir. For the best performance for CPU cooling, especially for the Danger Den TDX kit shown in the photo, you should run from reservoir to pump to the blocks, then to the radiator and back to the reservoir.

Configuring the loop this way should provide the best flow to the CPU block. Danger Den recommends the same loop that I described.

—Jason Ennis

SENIOR EDITOR JOSH NOREM RESPONDS: You're correct, Jason. While most kits use the pump>radiator>block configuration, Danger Den does indeed recommend having water go directly from the pump to the CPU water-block inlet in order to maximize the flow rate. For our review, we tested the kit using the recommended configuration. But we also tested the Danger Den kit using our standard config.

With the kit configured our way, we saw no difference in cooling performance from the Danger Den recommendation. We asked Danger Den to explain, and our rep said that having the pump go directly to the block is only important when using the more restrictive "inserts" in the block, to increase water pressure. Our block uses the stock insert, so it stands to reason that we didn't notice a performance difference between the two loop configurations.

VIDEOCARD TESTING CLARIFICATION

On page 26 of the August '06 issue, you state "...and beginning with this story, **Maximum PC** is switching its video-card testing procedures from a screen resolution based on a 4:3 aspect ratio (1600x1200) to one based on a 16:9 aspect ratio (1920x1200). However, in that same issue—and the subsequent September '06 issue—you continue to state in the "How We Test" sidebar (In The Lab) that you are running **Quake 4** at 1600x1200. I don't have the horsepower to run **Q4** at its uberscheisse settings, but I have always been under the impression that it supports a 16:9 aspect ratio. Am I missing something here?

—Rolf Hawkins

EXECUTIVE EDITOR MICHAEL BROWN RESPONDS: The "How We Test" sidebar that precedes the magazine's reviews section describes how we test systems. We use different methods for testing individual components, including videocards. At the risk of confusing you further, we erred in reporting that 1920x1200 was a 16:9 aspect ratio; it's actually 16:10. **Quake 4** supports these and many other resolution levels; it also supports all three aspect ratios, but you must manually edit its configuration file to enable less common resolutions (including 1920x1200). We chose that setting because it's the native resolution of the 23-inch Viewsonic VP2330wb display we're using to test videocards.



LETTERS POLICY: **MAXIMUM PC** invites your thoughts and comments. Send them to input@maximumpc.com. Please include your full name, town, and telephone number, and limit your letter to 300 words. Letters may be edited for space and clarity. Due to the vast amount of e-mail we receive, we cannot personally respond to each letter.

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MEMORY CHALLENGE!

Is low-latency memory faster than high-bandwidth memory? And what's more important, latency or clock speed? Find out next month!

ONLINE MORALS?

Is it illegal to steal Wi-Fi? Can you be sued for libeling someone in an online forum? We answer all your burning morality questions!

TOP-SECRET HARDWARE!

We have a piece of hardware that's so top-secret it's stored in a suitcase handcuffed to an editor's wrist. Believe us: This is one hardware preview you do not want to miss!

ALEX WILEY'S

Batman Begins

There's no mistaking the Batman logo, which is precisely why Alex Wiley recreated the shape for his entertainment-center case mod. He constructed the bat from aluminum, reinforcing the silhouette with screws studding the entire periphery. Multiple coats of PPG automotive paint and clear coat give the case its black lacquer finish, both inside and out. Inside, parts are strategically distributed across the entire wingspan. And because a tangle of wires coming down the back would be akin to Batman sporting a panty line, Wiley routed all the cables through the neck, which is made from 3/8-inch steel tubing. Air vents on the top of the wings and a total of eight fans keep the bat's internals cool.



With a wingspan of 55 inches, the Batman Begins mod lords over Wiley's 40-inch LCD, adding grandeur to whatever's on the screen.

With the front panel off, you can appreciate the artful arrangement of parts. Above the videocard, and behind a mesh screen, sits a slot-loading optical drive—discs enter at the top of the left wing.

Wiley spruced up the hard drive cages with logos he made from aluminum set in pigmented epoxy. The semi-transparent epoxy allows the light of 30 LEDs (in each cage!) to shine through. POW!

Wiley rerouted the motherboard ports to the back of the case, so he can thread the cables neatly through the hollow steel neck.



For his winning entry, Alex Wiley wins a \$500 gift certificate for TigerDirect to fund his modding madness! See all the hardware deals at www.tigerdirect.com, and turn to page 116 for contest rules.

If you have a contender for Rig of the Month, e-mail rig@maximumpc.com with high-res digital pics and a 300-word write-up.

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